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# BIOLOGICAL NOTES ON THE BURROW AND PREY OF ANOPLIUS VENTRALIS TARSATUS (BANKS)

(Hymenoptera: Pompilidae)

JERRY A. POWELL

*University of California, Berkeley*

A female of *Anoplius (Anoplius) ventralis tarsatus* (Banks)[1] was observed in a burrow-making process which is quite unusual in the recorded behaviors for the North American species of the genus *Anoplius*, in that the nest was constructed in a bifurcate pattern in two separate diggings.

The wasp, when first encountered, was in the process of digging the burrow at 1:42 p.m., March 19, 1957. The locality, about two miles west of Pittsburg, Contra Costa County, California, is one generally of sandy-silt soil on the valley plain of the Sacramento River. The female wasp had selected a spot on a hard-packed, bare path traversing a heavily weeded vacant lot, but at a place where the soil had previously been loosened, presumably by some burrowing animal. The digging within the hole was interrupted every few seconds by a brief period of backing out, dragging the sand several centimeters from the burrow entrance. The paralyzed spider, a large, immature lycosid, was in evidence, lying on the bare soil about 26 cm. to the east of the burrow site. The pompilid, on finishing the excavation process, about two minutes after the observations began, seemed to experience some difficulty in locating the prey, searching generally in the right direction within an area of a square foot or more. The spider was located after about one minute and was then dragged by one leg, the wasp walking backward, toward the burrow. The female wasp left the prey four times before reaching the tunnel entrance with it, each time to search about for a few seconds in finding the burrow and then to disappear inside for a few seconds. She finally backed down the tunnel, dragging the lycosid in, at 1:47 p.m. The first reappearance of the wasp did not occur until 1:56. At first only the abdomen appeared, and sand was pulled in, apparently in the filling process. However, it soon became obvious that additional digging was going on, since the wasp

[1] Determination by Marius S. Wasbauer, Department of Entomology, University of California, Berkeley.

began reappearing with loads of freshly-dug, damp soil and dragging these back from the entrance as in the original digging process. This behavior continued for fifteen minutes. Simple backing-out appearances were interspersed with those of busily kicking and scraping the debris about. Suddenly, at 2:11 p.m., the pompilid emerged quickly, flew into the tall grass nearby and disappeared.

The area was visited at frequent intervals during the next hour, but no sign of activity was encountered. The succeeding hour was spent some distance from the nesting site, and no attempt was made to check the area. At 4:10 p.m., as the afternoon was becoming cool and windy, an excavation of the burrow was commenced. The female wasp came out of the open burrow entrance almost immediately and this time was captured.

The main part of the burrow was found to consist of a straight entrance tunnel which entered the ground at approximately a 25° angle in an easterly direction. It was about 28 millimeters in length and six mm. in diameter, terminated by an oval cell which contained the spider. The cell was about seven by eleven mm., with the long axis at right angles to the entrance tunnel. The tunnel had been filled in and repacked for only about ten mm. at its lower end. A second tunnel, of the same diameter, joined the first at right angles to it at a point about eighteen mm. from the surface entrance. It proceeded in a southerly direction for about sixteen mm. then turned abruptly down, forming a vertical terminal portion, some eighteen mm. in length, with a slightly widened, curved tip. This terminus, the lowest point in the burrow, 33 mm. below the surface level, was not produced into a "cell" in the sense of provisioning cells. One might speculate as to the purpose of this second tunnel. Due to the late hour and the associated temperature, it might be surmised that the wasp had ceased activity for the day and was utilizing the burrow as a shelter for the night. However, the question of a possible use for this portion of the burrow in a second provisioning remains unanswered.

The spider was situated in the closed-off cell in a venter-side-down position, its body oriented with the long axis of the cell. A smooth, curved, elongate, white egg had been placed in a diagonal position on the side of the abdomen. The egg and spider were kept alive, but the egg did not hatch, probably due to

desiccation. The spider was kept in a pill box, without being fed, and recovered partially. The same evening (March 19) it responded to stimuli to the legs on only one side of the body and did not seem to have any coordination. By the second day all the appendages reacted to stimuli, but the spider could not right itself when turned over, or move any distance. After the third day it seem to be fully recovered except that it did not attempt to run on a flat surface. (This is in marked opposition to other individuals of the same species observed in the field which ran a yard or more very rapidly at the slightest disturbance.) On March 24, although still weakly moving, it could not complete its final moulting, and it was preserved while in this condition. The spider was subsequently determined as an adult female of *Alopecosa gertschi* Schenkel, by Dr. Willis J. Gertsch of the Department of Insects and Spiders, American Museum of Natural History, who states *(in litt.)* that the species is widely distributed along the west coast.

The Pittsburg locality was revisited twice during the week following the observations, and no additional specimens of *Anoplius* were encountered, although individuals of the lycosid prey were quite abundant.

Although much more detailed biological observations have been given for *Anoplius imbellis* Banks (Wasbauer 1957), little is known of the nesting habits for the other members of the subgenus *Anoplius* in North America (See: Evans 1951). Essig (1926) has listed *Lycosa pratensis* (Emerton) (Lycosidae) as a prey for *A. ventralis tarsatus* (Banks) in Berkeley, California, and Williams (1919, 1931) states that the species, an introduction in Hawaii, preys on a variety of spiders there, digging a separate burrow for each one. (Given as *Psammochares luctuosus* (Cresson) by both authors.)

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1926. "Insects of Western North America," 1035 pp., MacMillan Co., New York.

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WILLIAMS, F. X.
1919. Philippine wasp studies. Part II Descriptions of new species and life history studies. Hawaiian Sugar Planter's Assoc. Ent. Series Bull. 14:79–110.
1931. "Handbook of Insects and other Invertebrates of Hawaiian Sugar Cane Fields," 400 pp., Hawaiian Sugar Planter's Assoc., Honolulu.

## BOOK REVIEW: MOST SIGNIFICANT ANIMALS?

ZOOGEOGRAPHY: the geographical distribution of aminals by Philip J. Darlington, Jr.; John Wiley & Sons, Inc., New York. xi + 675 pp. 80 figs. ($15).

It will undoubtedly be a shock to many entomologists to discover that such an outstanding Coleopterist as P. J. Darlington considers the vertebrates to be the "geographically most significant animals." However, his reasons for this viewpoint as well as his other opinions and principles are clearly stated. Although the vertebrates comprise only 3 or 4 per cent of the animal kingdom, "they are the best-known animals: most familiar, best collected, best classified, with the best fossil record." Furthermore, they are varied in habits and physiology. He does concede that invertebrates show the histories of some islands better than do the vertebrates.

The introductory chapter is required reading for anyone interested in any aspect of the distribution of animals. In this chapter, Darlington discusses clearly and concisely subjects such as mapping, climate, vegetation, geological time, and dispersal as they relate to zoogeography. In addition, he defines his usage of special terms and gives his "working principles of zoogeography."

The next five chapters are detailed treatments of the zoogeography of freshwater fishes, amphibians, reptiles, birds, and mammals. For each of these groups a short account of the classification, fossil record, and pertinent characteristics is given and then is followed by discussion of their limits of distribution, transitions and barriers in distribution, dominance and competition in relation to distribution. These five chapters each end with a summary of the pattern of distribution, a history of dispersal, and a list of families of the group. The family list contains among other things the region of occurrence, main pattern of distribution, numbers of genera and species, and fossil record.

On the basis of this detail, the main pattern of vertebrate distribution, discontinuities, faunal regions, and the transitions between regional faunas are discussed in the seventh chapter. Island patterns and the evolution of patterns follow in the next two chapters. Chapter ten is concerned with what zoogeography tells of the past. In the final chapter, Darlington reviews his principles of zoogeography and then traces man's geographical history.

The zoogeography of insects is still in a very early stage of development. Consequently, no one can judge, at this time, how well Darlington's conclusions and patterns of distributions for the vertebrates apply to the insects. Entomologists working in the infant science of insect zoogeography can, if nothing else, use the vertebrate patterns as standard patterns of reference and they had best heed Darlington's working principles as this field grows and matures.—RAY F. SMITH, *University of California, Berkeley.*

# A NEW SPECIES OF COPIDOSOMA CLOSELY RELATED TO C. NANELLAE SILVESTRI[1]

(Hymenoptera: Encyrtidae)

C. D. F. MILLER[2]

*Insect Systematics and Biological Control Unit*
*Entomology Division, Ottawa, Canada*

Gahan (1930) reported *Copidosoma nanellae* Silvestri as present in North America, heavily parasitizing *Recurvaria thujaella* Kft. Later he recognized his error and asked Peck (1951, p. 483) to record this species as "*Copidosoma* n. sp. (*nanellae* Amer. authors, not Silvestri)."

This is a transcontinental species that occurs as far south as Connecticut in the east and California in the west. It has been reared from a number of microlepidopterous hosts but is now economically important because of its controlling effect on *R. canusella* Free., *R. milleri* Bsk., *R. starki* Free., and *Recurvaria* spp., which are destroying many acres of lodgepole pine in the Rocky Mountains.

Dr. B. D. Burks, Entomology Research Branch, U.S. Department of Agriculture, Washington, stated in correspondence that Mr. A. B. Gahan, now retired, reversed his original decision on the identity of this form after he examined female co-types of *C. nanellae* from Portici, Italy. Dr. Burks wrote, "The chief difference between the Palaearctic and North American forms is in the antennae of the female. In *nanellae* the club is almost or quite as long as the funicle (five-sixths as long in [the Washington] specimens, although the original description says the two are equally long). The North American form has the female antennal club two-thirds to four-fifths as long as the funicle. The two also differ in the color of the legs; the European form has the mid-tibia almost entirely yellow, while this is mostly black in the North American form."

The writer has recently found that the male genitalia of species of *Copidosoma* are distinct. Comparison of the male genitalia of the two entities supplemented the evidence compiled by Mr. Gahan and verified that the North Amercian form is a new species.

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[1] Contribution No. 3714, Entomology Division, Science Service, Department of Agriculture, Ottawa, Canada.

[2] Associate Entomologist.

## Copidosoma deceptor Miller, new species

*Copidosoma nanellae* Silvestri; Gahan, 1930, Proc. U.S.N.M. 77:7.

*Copidosoma nanellae* Silvestri; Britton, 1938, Bull. Connecticut State Geol. and Nat. Hist. Survey 60:141.

*Copidosoma nanellae* Silvestri; Procter, 1938, Biol. Survey of Mount Desert Region 6:425.

*Copidosoma nanellae* Silvestri; Doucette, 1941, J. Econ. Ent. 34:588.

*Copidosoma* sp.; Baird, 1942, Canad. Insect Pest Rev. 20:116.

*Copidosoma nanellae* Silvestri; Proctor, 1946, Biol. Survey of Mount Desert Region 7:485.

*Copidosoma nanellae* Silvestri; Graham, 1947. *In* Control of forest insects in the Province of Ontario by introduction of insect parasites. (Canada Dept. Agr.) Div. Ent. processed report, pp. 75–77.

*Copidosoma nanellae* Silvestri; Craighead, 1950, U.S. Dept. Agr. Misc. Pub. 657:614.

*Copidosoma* sp. Baird, 1950, Canad. Insect Pest Rev. 28:234.

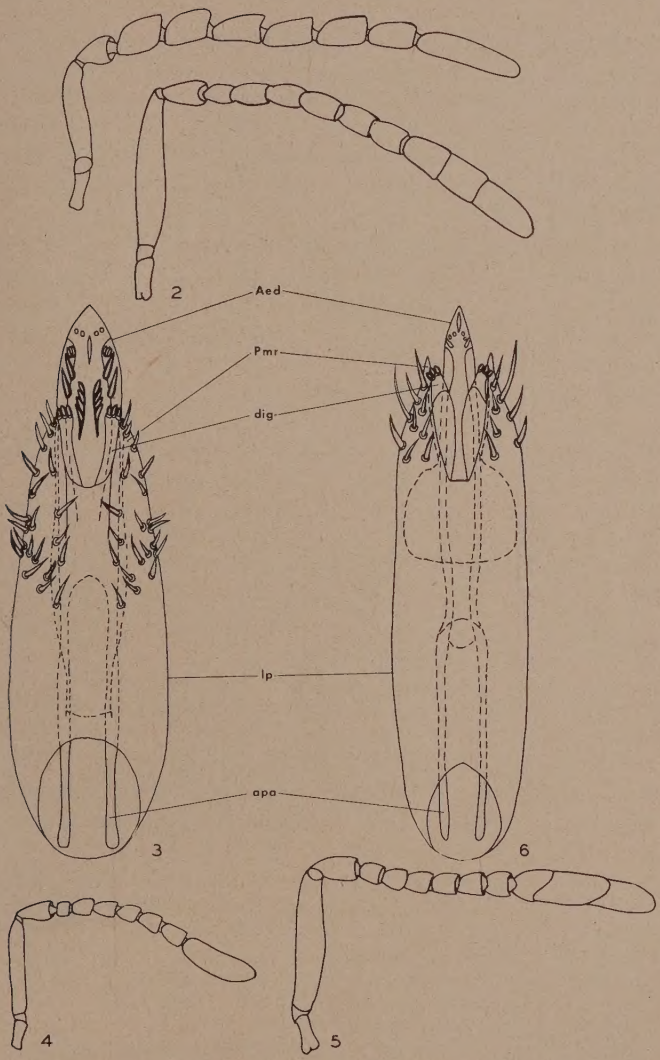
*Copidosoma nanellae* Amer. authors, not Silvestri; McLeod, 1951, Canad. Ent. 83:299.

*Copidosoma nanellae* Amer. authors, not Silvestri; Silver, 1957, Canad. Ent. 89:180.

*Copidosoma* n. sp. *(nanellae* Amer. authors, not Silvestri); Peck, 1951, U.S.D.A. Agr. Monogr. No. 2, p. 483.

*Male: Head.*—Black, subtriangular from anterior aspect, closely punctate; mandible brownish-yellow, tridentate; malar space half the longitudinal diameter of the compound eye; clypeus with 5–6 erect, black hairs; distance between lateral ocellus and compound eye equal to diameter of middle ocellus; distance between lateral ocelli greater than that between them and middle ocellus; compound eyes bare; scrobes smooth. *Antenna* (Fig. 1).—Black; scape as long as pedicel and first flagellar segment combined; pedicel equal in width to but shorter than the first flagellar segment; flagellum filiform; funicular segments equal in length and width; club twice as long as last funicular segment; flagellum strongly pubescent. *Thorax.*—Black, the scuteum and mesopleura with purplish reflections; scutum and scutellum subequal in length, and having obscure, widely scattered, black, suberect hairs; scutum closely punctate; scutellum coriaceous except for smooth, shiny distal portion; avilla coriaceous. *Wings.*—Stigmal vein longer than marginal; linear calva indistinct; marginal hairs short; costal cell of posterior wing short and narrow. *Legs.*—Black, the bases and apices of femora and tibiae white; tarsi whitish except for apical segments, which are blackish; spur of middle tibia a little shorter than metatarsus. *Abdomen.*—Black, subtriangular; strongly depressed, shorter than thorax; genitalia as in Fig. 3.

*Female:* Resembling the male except in the following characters: *Antenna* (Fig. 2)—Club-shaped; scape longer than pedicel and first three flagellar segments combined; pedicel wider than and almost twice as long as the first flagellar segment; funicle progressively wide apically; club triarticulate, ¾ as long as the funicle; flagellum with a minute obscure pubescence. *Abdomen.*—Ovipositor extending 1/3 its length beyond apex of abdomen.




## Explanation of Figures

Figs. 1–3, *Copidosoma deceptor* Miller. 1, Male antenna. 2, Female antenna. 3, Male genitalia; aed, aedeagus; pmr, parameres; dig, digitus; lp, basiparamere; apo, basal apodeme of aedeagus. Figs. 4–6, *Copidosoma nanellae* Silvestri. 4, Male antenna; 5, Female antenna; 6, Male genitalia.

*Holotype: male*, CASCADE VALLEY, 22 MILES NORTHEAST OF BANFF, ALBERTA. Reared from *Recurvaria* sp. on lodgepole pine. Genitalia and antenna on chalcid slide number 217, type number 2156, Canadian National Collection. *Allotype: female*, Mount Eisenhower, Banff National Park, Alberta, June 30, 1950. Reared from *Recurvaria* sp. on lodgepole pine. Genitalia and antenna on chalcid slide number 218, C.N.C.

*Paratypes:* 38 females, 49 males from Connecticut, New York, Maine, Nova Scotia, New Brunswick, Quebec, Ontario, Alberta, British Columbia, Idaho, Oregon, Colorado, and California in Canadian National Collection, U.S. National Museum, British Museum (Natural History), University of Naples Museum, Geneva Museum, and Dr. Vittorio Delucchi's private collection.

HOSTS: *Acleris variana* (Fern.), Nova Scotia; *Eucordylea huntella* Keif., Oregon; *Exoteleia dodecella* (Linn.), Connecticut; *Paralechia pinifoliella* Cham., New York; *Recurvaria apicitripunctella* Clem., Ontario; *R. canusella* Free., British Columbia; *R. milleri* Bsk., California; *R. moreonella* Heinr., Oregon; *R. piceaella* Kft., New York, Quebec; *R. starki* Free., Alberta; *R. thujaella* Kft., Maine, New Brunswick; *Recurvaria* sp. on *Rhododendron*, Oregon; *Recurvaria* spp. on *Pinus contorta* var. *latifolia* Engleman, British Columbia, Alberta.

### COPIDOSOMA NANELLAE Silvestri

*Copidosoma nanellae* Silvestri, 1922, Boll. Lab. Zool. Agr. Portici 16: 295–301.

The female of *deceptor* is so similar to that of *nanellae* that for years the two were considered conspecific. The following is a description of the characters of *nanellae* that are significantly different from those of *deceptor*.

*Male: Antenna* (Fig. 4).—Black; scape as long as the pedical and the first three flagellar segments combined; flagellum club-shaped; funicular segments progressively lengthened; pedicel wider and more than twice as long as the first flagellar segment; club three times as long as the apical funicular segment; flagellum with a minute obscure pubescence. *Fore Legs.*—Bases of femora black. *Middle Legs.*—Tibiae almost entirely yellow. *Abdomen.*—Genitalia as in Fig. 6.

*Female: Antenna* (Fig. 5).—Pedical twice as long as the first flagellar segment; club 5/6 as long as funicle. *Fore Legs.*—Bases of femora black. *Middle Legs.*—Tibiae almost entirely yellow.

*Lectotype male*, AVELLINO, ITALY, June 10, 1919, *Recurvaria*. *Lectoallotype female*, same data as lectotype. *Co-types* 8 males,

1 female, same data as lectotype; all types in the University of Naples Museum, Portici, Italy.

Credit is due to Mr. G. S. Walley and Dr. O. Peck, the author's colleagues, for helpful suggestions and for criticisms of the manuscript. The author wishes to give special thanks to Drs. V. Delucchi and B. D. Burks for the loans of material from the University of Naples and United States National Museums, without which the completion of this paper would have been impossible.

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# A NOTE ON SALMACIA FRONTOSA VARIETY ATRA (COCKERELL)

(Diptera: Larvaevoridae)

Paul H. Arnaud, Jr.[1]

*Entomology Research Division, Agr. Res. Serv., U.S.D.A.*

The purpose of this note is to call attention to a name originally proposed in the genus *Gonia* which appears to have escaped the notice of several revisers (Tothill, 1924; Morrison, 1940; Brooks, 1944) of North American *Salmacia* Meigen, 1800 (=*Gonia* Meigen, 1803). Aldrich (1905, pp. 478–479) may have omitted the name from his catalogue in the belief that it was an unpublished Coquillett manuscript name, since a card from the Aldrich file with this name bears the notation "[Coq. MS]." Cockerell's name is a homonym, since the combination *Gonia atra* Meigen was first proposed in 1826. I can not at this time assign the name to any certain synonymy.

Salmacia frontosa var. atra (Cockerell)

1889. *Gonia frontosa* var. *ater* Cockerell, Tenth Rep. Colo. Biol. Assoc.:

[1] I wish to acknowledge with thanks information and aid received from Dr. Hugo G. Rodeck, Director of the University of Colorado Museum, and Dr. Alan Stone, Entomology Research Division, U.S.D.A.

[p. 3]. [The entire reference reads: "We have been overhauling our flies of the genus *Gonia* by the light of Dr. Williston's paper in 'Canadian Entomologist,' 1887. Among the western Custer county specimens is one of *G. frontosa* with the thorax and abdomen almost entirely black, the striping and banding of the type being practically obsolete: we shall call it var. *ater*. We have also two species belonging to the Exul group. One may be a form of *G. exul*, the other would seem to be new. A fourth species, from Dillon, looks like a *Gonia*, but probably belongs to a distinct genus."]

1889. *Gonia frontosa* var. *ater*, Cockerell, West Amer. Scient. 6(47):106:

[Distribution: near Swift Creek, Custer County, Colorado. "thorax and abdomen almost entirely black."]

1893. *Gonia frontosa* var. *atra*, Cockerell, Trans. Amer. Ent. Soc., 20:368:

[In list of Custer County, Colorado insects. References provided are: "10th Rep. Colo. Biol. Asso'n.; 'West. Am. Sci.' 1889, September, p. 106."]

Correspondence with Dr. Hugo G. Rodeck, revealed that there are no specimens in the collections of the University of Colorado Museum which bear Cockerell's trinomial, nor are there any specimens from Custer County which might be the basis of this description. A search of the *Salmacia* in the collection of the U. S. National Museum proved negative as well.

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Morrison, F. O.

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Tothill, J. D.

1924. A revision of the nearctic species of the genus *Gonia* (Diptera: Tachinidae). Canadian Ent. 56(8):196–200; (9):206–212.

# DESCRIPTIONS OF NEW NEOTROPICAL TABANIDAE MOSTLY IN THE CALIFORNIA ACADEMY OF SCIENCES

(Diptera)

CORNELIUS B. PHILIP[1]

This report contains discussion and descriptions of Tabanidae mostly from the West Coast of South America, in part based on collections made by Drs. E. S. Ross and A. E. Michelbacher in 1950 to whom the writer is indebted for privilege of studying their material. All types described below are in the California Academy of Sciences (CAS), San Francisco. Study of pertinent types in European museums by the writer in 1953, on a travel grant from the American Philosophical Society, facilitated the present report. BMNH is the abbreviation used for British Museum (Natural History).

**Mycteromyia philippii** Philip, new species

Philippi (1865) misidentified the only species, *Pangonia conica* Bigot which he mentions in the characterizing of his genus *Mycteromyia*, though he adds and describes three new species under the genus, namely, *fusca*, *brevirostris*, and *murina*. *M. fusca*, "9 lin." (about 18 mm.) is undoubtedly the true larger *M. conica* with reddish legs and bases of the antennae, and isolated triangles not forming a pale-haired line on the abdomen. A pair of each sex compared with the type female of *M. conica* in BMNH was dissected by Mackerras (1955) who calls attention to the remarkable genitalia in this genus; he was mistaken, however, in stating that *Mycteromyia* was "originally monotypic for *Pangonia conica* Bigot."

Specimens in CAS agreeing with *M. "conica"* Philippi not Bigot appear to be a direct, unnamed species.

*Holotype female*, 13 mm. Eyes bare. Front grayish pollinose with coarse, sparse black hairs, sides subparallel, about equal in height and breadth, three plain ocelli not on a raised prominence at the vertex. Subcallus and frontoclypeus gray pollinose, the latter with two lateral brown bands and produced about equal to the height of the front. Antennae, palpi and proboscis entirely black, the palpi longer than the antennae, and the proboscis nearly as long as the abdomen. Cheeks and posterior head whitish pollinose and pilose, including beard. *Thorax* prominently striped with four

[1] From the U. S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, National Institute of Allergy and Infectious Diseases, Rocky Mountain Laboratory, Hamilton, Montana.

dark brown stripes on a gray ground, the sublateral stripes broken at the humeral sutures; covered with sparse brown and gray hairs. Scutellum black with grayish tinges laterally and margined with white hairs. Pleura gray with mostly pale hairs. Coxae and femora dark brown, predominantly black haired. Tibiae and tarsi dark reddish with black hairs but no hind-tibial fringe. Wings subhyaline, the crossveins ("nervis transversis") with faint clouds but the longitudinal veins not margined with brown as in *M. conica*, cell $R_5$ closed and long petiolate, spur-veins as long as stems. Subepaulets bare. Halteres dark brown. *Abdomen* dark brown, velvety black underneath, and with coarse black hairs extending around onto the sides of tergites 3 to 7. Coarse white hairs on tergites 1 and 2 except on extreme margins, and in a narrow, continuous median line to the tip of the abdomen.

*Holotype locality:* "CHILE, E. P. Reed Collection."

*Allotype male*, 13 mm. Eyes dichoptic. Like the ♀ and readily associated but differs in following respects:

Front narrower (index, 1:1.67), snout a little shorter than front, and proboscis a little longer than the abdomen. Pale hairs of beard and body pale yellowish, confined on the first two tergites to the hind margins, the median line expanding on each incisure. Tergite eight swollen and bulbous with mixed black and pale hairs.

*Allotype locality:* "Las Trancas, 10–8–39, Chile, E. P. Reed Collection."

Paratype females, 1. "Q. Seca, El Panque, 29–8–37, Chile, E. P. Reed Collection"; 1. "El Sauce, Elqui, 5–XI–37, Chile, E. P. Reed Collection" (In Coll. C.B.P.); "Hda. Illapel, Coquimbo, Chile, 24–25 Oct., 1954. Luis E. Penna" (In Coll. L. L. Pechuman). Agree with the holotype but the pale hairs on the dorsum of the abdomen considerably worn in two, revealing the first two tergites as with gray integument, and two submedian dark dashes on the second.

*M. bejaranoi* Barr. and Duret from Neuquen, Argentina, has some similar features but lacks the black venter, there are pale middorsal triangles rather than a longitudinal line, and the tibiae are reddish-yellow haired.

From the description of hairy body but bare eyes, and long proboscis, *Pangonia obscuripennis* Philippi also suggests a species of *Mycteromyia*, but the closed first posterior cell is not mentioned. This species probably has some resemblance to the following, *M. asper*, new species, but the red of the former is confined to the sides of tergites 2 and 3, the first segment is gray, the beard is yellowish, the wing veins are brown margined, and it is a larger insect with apparently longer proboscis.

**Mycteromyia asper*** Philip, new species

A rather small, dark species with red-sided abdomen, spotted wings, bicolored legs, and an especially shaggy, black-haired crest on the front and with long, white-haired beard.

*Holotype female*, 10.5 mm. Eyes bare. Front very wide, divergent above, basal width greater than height as 1:0.8, buff-gray pollinose with a large median patch of sooty pollen in the middle, at the top of which (and just ahead of the vertex) is located a low ocellar tubercle with three ocelli. Snout ash-gray pollinose, unusually short, forming a transverse ridge beneath the antennae. The latter short and slender, entirely black, the scape unusually short, expanded in the distal half to equal the pedicel and basal annulus in thickness as well as the last in length; scape hardly twice the length of the beadlike pedicel, both with coarse black hairs; flagellum a little more than twice the length of the two basal segments combined, the apical annulus but little longer than the adjoining one. Palpi black with concolorous hairs, longest on the basal segment, the two segments about equal in length, the apical segment more slender and tapering, not clavate. Proboscis a little longer than the thorax. Vestiture of entire head especially long and shaggy, a heavy black patch on the front, the beard creamy white with scattering black hairs around the lower ocular margins, and sparse black and yellow ones on the snout. *Thorax*, including the antealar tubercles and scutellum, black with five narrow gray lines and with similar diagonal connections laterally at the sutures in front of the wing bases. Vestiture sparse black and yellow dorsally, denser buff below with a median patch of dark hairs on the pleura. Coxae and femora black, the former with bushy pale hairs grading into black and some yellow on the femora. Tibiae reddish, the fore and hind pair darkened apically, covered with short brown hairs; no hind-tibial fringe. Wings tinted with prominent clouds on the cross-veins, cell $R_5$ closed and petiolate, spur-veins present. Knobs of halteres bright yellow. Subepaulets bare. Sides of abdomen and entire venter brick red; tergite 1 dull black with outer margins red, brighter black geminate spots on tergites 2 to 4 enclose flat, pale yellow triangles tallest on 4 which nearly bisects the black. Vestiture shaggy and black; pale yellow hairs predominate on tergite 1, and on the triangles and outer corners of the following tergites. Hairs of venter predominantly pale yellow anteriorly but blackish caudad.

*Holotype locality:* "Fray Jorge Forest, Coquimbo, Chile. 11 December, 1950, Ross and Michelbacher."

The red-sided abdomen is distinctive from all other species including *M. brevirostris* Philippi which is a more uniformly brownish insect with brown basal antennal segments and scutellum, and pale brown legs. The proboscis is reported as not as long as the thorax. Kröber (1930b) adds the following characters which differ from *M. asper*: Front almost quadrilateral with yellowish

* Latin, rough, in reference to the shagginess, particularly of the head.

hair; basal annulus of flagellum enlarged; snout a little longer than the front; white hairs on the hind border of the scutellum and parts of the abdomen; and halteres brown.

**Mycteromyia eriodes*** Philip, new species

A medium-sized, grayish, hoary species resembling a woolly bombyliid with spotted wings, elongate proboscis nearly as long as the body, and bulbous genitalia.

*Holotype male*, 14 mm. Eyes bare, widely dichoptic. Front gray pollinose with sparse yellow bristles below, brown at vertex, sides subparallel; 1.4 times higher than basal width between the inner corners of the eyes; vertex depressed below upper eye level; ocellar tubercle set well below vertex, with three plain ocelli; no calli. Subcallus pearly gray pollinose, bare in middle, a few short yellow hairs laterally. Snout from base of antennae, equal in length to height of front, brown with sparse gray pollen except on a faint brown line on each side, and with very few pale hairs. Scape cylindrical, dark brown, twice the length of the pedicel; flagellum black with eight annuli, the basal one a little longer than thick, the apical one elongated over twice the length of the preceding. Palpi brown with pale hairs, the apical segment clavate and about three and one-half times longer than median thickness and a little longer than the slender labellae. Proboscis black. Beard dense and white. *Thorax* above and below and scutellum covered with dense, long white pile, the notum with four prominent bare brown lines. Coxae brown, remainder of legs reddish yellow, with long white hairs basally, short brown hairs on the tibiae, no hind-tibial fringe. Wings slightly tinted with prominent clouds on the cross-veins, the veins dark brown apically, reddish basally, cell $R_5$ closed and petiolate, spur-veins present. Halteres pale reddish; subepaulets bare. *Abdomen* compact and wide, rapidly constricted to the sixth segment, the brownish gray integument obscured by heavy white pile with especially dense fringes on the incisures, the eighth tergite pale reddish, swollen and bulbous with coarse yellow hairs, sparser dorsally. Venter contrasting chocolate brown with concolorous hairs.

*Holotype locality:* "CHILE, OLMUE, October 23, 1917." "E. P. Reed Collection." Labelled "*Mycteromyia conica* Bigot det. Reed."

Paratype males: 1, same data (in Coll. C.B.P.); 1, same locality but "18 October, 1917"; 1, Valparaiso, 15 November, 1922, E. P. Reed Coll. (CAS).

The unusual woolliness due to long white pile over the whole body is distinctive. Compared to the type male of *M. cinerascens* (Bigot) (thought to be a female by Bigot) and another male from Valparaiso Province, this is much paler and more hirsute. *M. cinerascens* (specimen from Valparaiso agreeing with type in

* From Greek, woolly.

BMNH) has sparser and shorter, yellow hair on notum and abdomen, the venter is not contrasting brown, and the palpi are longer and darker. Though Kröber must have seen the type of *cinerascens* in the British Museum, it is apparent that most of his remarks really refer to *eriodes*.

MYCTEROMYIA HIRTIPALPIS (Bigot)

Syn. *M. edwardsi* Kröber. The types were compared by Fairchild and the writer in the British Museum. The eyes are bare and Kröber (1930a) was mistaken in erecting a new genus, *Caenopangonia*, for *hirtipalpis* on hairy eyes. Except for the proboscis described as long as thorax and abdomen together, *M. murina* Philippi also agrees and would be the earliest name. Possibly the proboscis was unusually extended. *Silvestriellus patagonicus* Brèthes from Santa Cruz (? Argentina) may also be this species but the description is inadequate to decide.

A series of five specimens in CAS and Pechuman Collections from various localities in Chile suggests either considerable variation in amount and distribution of pale hairs, especially underneath, or that there is a closely knit, composite group here. In one the hairs of the thorax and basal abdomen are rust red rather than straw yellow, in another, they are almost entirely blackish. The question cannot be settled with the material at hand. The proboscis is a little shorter than the abdomen in all. *M. philippii* Philip is at once distinguished from this group by its longer snout, proboscis and palpi.

In view of the new species described from Argentina by Barretto and Duret (1954) and those above, it is unfortunate that the existence of Philippi's types are unknown. The type, said to be in Vienna, of *M. robusta* Kröber from country unknown, was not found during a visit by the writer in 1953. Like *M. asper* Philip, it has a reddish sided abdomen, but is a much larger species with front divergent below.

The specimens from Chile in Vienna identified by Kröber (1930) as *M. fusca* and *M. brevirostris* were studied. The former has sides of abdomen more orange yellow than olive brown and could not be *M. philippii* (nor *M. fusca* Philippi = *M. conica* Bigot). I cannot place this specimen but it may relate to *M. bejaranoi* Barrett and Duret from Neuquen. It is possible that the two females under *M. brevirostris* with nearly denuded, almost orange yellow abdomens are correctly placed by their concolorous

scutellums and legs and short proboscides. In these, the frontoclypeus (snout) is hardly produced so that the scape extends beyond the oral margin viewed from the side. The comparative extent to which the frontoclypeus is produced will be an important morphological criterion in members of this genus, among which there appears to have been an almost precinctive, evolutionary burst of extraordinary specialization in southern South America.

MESOMYIA (VEPRIUS) RUBRICORNIS (Kröber), new combination

The male only was originally described. Ross and Michelbacher took a female "18 km. east of San Carlos, Nuble, Chile, 24–XII–50" which may be designated the allotype. The bright red, disc-like antennal plate serves to associate this otherwise entirely black insect with the male, and also to distinguish it from *M. carbo* (Macquart) (syn. *presbiter* Rondani). The two species otherwise resemble one another so closely it would be exceedingly difficult to assign specimens with broken antennae. The present allotype female, 12 mm., has the frontal keel only slightly expanded below, whereas, two *carbo* have the keel clavate over half the width of the fronts, but this may be only individual variation. The plates are even more disclike in shape in the allotype than in *carbo*. A considerable amount of plant pollen adherent to the body of the allotype indicates flower visitation.

A male each is at hand from Penco and Angol, Chile, with antennae intact. Mackerras (1955) has shown the correct generic assignment of the group.

SCAPTIODES GAGATINA (Philippi), new combination

This is a small, shining black species with clear wings that appears to be not uncommon in some parts of Chile. A series was taken by Ross and Michelbacher "west of Angol, Crest of Sierra Nahuelbuta, 1200 meters, 3 January, 1951." Kröber (1934) assigned the species unnaturally to *Dasyommia* because of the ocellar tubercle and hairy eyes. *Scaptoides nigerrima* Enderlein, a probable synonym, was placed in Tribe Lepiselaginae because of the lack of tooth on the antennal plate, a character which combined with the bare subepaulets justifies Mackerras (1954) in placing the species closer to *Dasybasis* and *Stenotabanus* in the Diachlorini.

The type of *S. nigerrima* was studied on loan from Berlin Museum through courtesy of Professor Fritz Peus, and is somewhat soiled preventing synonymy here with certainty, but struc-

tural characters appear in good agreement indicating at least congeneric relationships with *gagatina*.

**Chaetopalpus acroterius** Philip, new species

A small, black species with contrasting, bright yellow appendages (hence the name from "acroteria," the extremities of the body) and yellow baso-costal areas of the otherwise fumose wings.

*Holotype female*, 10 mm. Eyes plainly hirsute with rather short yellow hairs; pattern (relaxed) unbanded. Front with sides plainly convergent above, index of basal width to maximum height, 1:1.9, shining black with inconspicuous black hairs, smooth in the upper half, finely, transversely wrinkled below with a bulge in the middle but no defined callosity; three ocelli on a prominent, raised tubercle at the vertex. Subcallus very small and narrow, the upper margin shining brown, the lower margin a narrow band of yellow pollen just above the antennae. Face and cheeks pale brown pollinose with black hairs, separated by unusually deep, apodemal furrows on each side. Antennae with two basal segments dull yellow with coarse, sparse black hairs, the pedicel half as long as the scape, neither produced above, the third segment bright yellow, the plate nearly as tall as the scape, and tapering to meet the annuli more gradually than the abrupt juncture between disclike plate and annuli seen in *C. coracinnus*, while the terminal segment is more pointed than in the latter; the plate has suggestions of transverse sutures but these are not plain like those dividing the terminal four annulations, or as seen in the flagellum of *Protodasyapha hirsutuosa* (Philippi). Palpi and proboscis black, about equal in length, and hardly longer than the front, densely black haired, the first segment bulbous subshiny, the second segment cylindrical, gently curved and tapered to a blunt point without evident sensorial pits. There is a wide, gray pollinose post-ocular rim on the head with brown and some yellow hairs on the hind margin. *Thorax* entirely, coxae and femora dull blackish brown, with sparse black pile, longer below. All tibiae, tarsi, and halteres contrasting bright yellow with concolorous hairs on the legs, no definite hind tibial fringe. Wings smoky, the stigma, costal cell, and first M cell basad of the two basal cells plainly yellow. Cell $R_5$ wide open, short spur-veins present. Subepaulets reduced to small, bare scales, and the tegulae smaller than usual. *Abdomen* subshining blackish brown, with sparse inconspicuous brown and black hairs.

*Holotype locality:* VALPARAISO, CHILE, November, 1900. P. Herbst.

It is difficult to decide for generic placement if the flagellum of the antennae has pseudoannulations in the basal plate or if there are actually more than five segments. Some head characters suggest relationship to Nearctic *Apatolestes comastes* Williston, and *Brennania hera* (Osten Sacken) but these Nearctic species have sensorial grooves or pits on the edges of the palpi, and lack the deep apodemal grooves on the sides of the face, plus better

developed subcalluses and less differentiated but plainer basal annulations in the antennal flagellum.

**Chaetopalpus abaureus*** Philip, new species

A small, dark brown, predominantly golden-haired species with long and slender palpi.

*Holotype male*, 9 mm. Eyes densely yellowish-brown haired, the upper facets but little enlarged. Ocellar tubercle dark brown with three ocelli and long brown hairs, raised above the upper eye level. Frontal triangle small, brown with a strong median sulcus. Fronto-clypeus depressed giving the cheeks on either side a swollen appearance, the whole brown and covered with long, dense golden and brown pile. Beard golden yellow. Scape and pedicel reddish brown with bushy black hairs, the former a little longer than tall; flagellums missing. Proboscis very short, the golden-haired palpi reaching to its tip. Apical, palpal segment dull orange, slender and tapering downward to a blunt point, a little over three times as long as basal thickness; basal segment brown and swollen. *Thorax* and dorsum of the abdomen deep chocolate brown entirely covered with long golden yellow pile (viewed from the side), lighter under the wing bases. Coxae, fore femora on the basal two-thirds, and fore tarsi brown, remainder of legs bright reddish; hairs predominantly yellow basally with brown ones intermixed on the tibiae, and predominating in the hind-tibial fringe. Wings smoky with clouds intensified on the basal cross-veins; cell $R_5$ open, spur-veins present. Halteres brown with yellow seams. Subepaulets bare. Dorsum of abdomen blackish, extreme lateral margins of tergites 2 to 4 and the incisures of 2 and 3, as well as the entire venter orange-red with dark shadows on sternites 1, 2, and 7. Pile on entire abdomen long and golden yellow.

*Holotype locality:* "15 MILES SOUTH OF LOS VILOS, COQUIMBO, CHILE, 13 December, 1950, Ross and Michelbacher."

*C. mendozanus* Enderlein from Argentina, as discussed and figured by Kröber (1930a), appears to be closest but differs in having short chunky palpi with black hair, the pale vestiture whitish gray on thorax and abdomen blackish rather than golden, the halteres bright ocher yellow. The two may turn out to be color phases of the same species but the palpal shapes are quite different, at least in the males.

**Fidena nitida** Philip, new species

A compact medium-sized, polished black species of the *nitens* group with shining black snout, black appendages, the tibiae contrasting bright yellow, white beard and wings sharply darkened basad of the outer tips of the basal cells.

*Holotype female*, 16 mm. Eyes densely covered with short brown hair.

* Latin, from golden (quality), in reference to the over-all golden yellow color of the vestiture.

Front blackish with black hairs, sides parallel, index 1:3, the three ocelli on a prominence at vertex. Subcallus narrow, thinly dusted with black pollen; snout piceous, shining, subequal to front in length. Beard dense, snow white. Antennae and palpi black, slender, the former considerably longer than the snout, the palpi a little less than one-quarter the length of the proboscis; the last is elongate, subequal in length to the head and thorax combined, excluding the snout. *Thorax* and scutellum blackish, with some dark brown shading, entirely black haired except for two narrow white lines above the wing bases. Pleura, chest, coxae, femora, and their vestiture, coal black. Tibiae, tarsi, and their hairs contrasting bright yellow. Wings pale yellow, the basal cells sharply dark brown. Halteres black, subepaulets bare. *Abdomen* broad, compact, enameled black in appearance with short black hairs, small white patches of hairs on the outer corners of tergites 2 and 5, and of sternites 2, 3, 4, and 5. Hairs of middorsum entirely black.

*Holotype locality:* "PERU: MONSON VALLEY, TINGO MARIA, 21–X–1954. Schlinger and Ross."

The coal-black antennae and palpi, and narrower front will separate this from *F. eriomeroides* Lutz, and the bicolored legs and absence of median, white-tufted triangles on the last few abdominal segments from *F. nitens* Bigot, both of Brazil.

FIDENA ALBIFRONS (Macquart)

Originally described in *Pangonia, sens. lat.*, the species has been variously transferred to *Lilaea, Listraphapha* and finally *Lilaeina,* which Mackerras (1955) places with question as a synonym of *Fidena.* Though females are well-known from several localities, the first male, which is described below was taken by the Ross Expedition at Zapallar, Aconcagua Province, Chile, 27 November, 1950.

*Allotype male,* 14 mm. Differs from the female in the usual sexual characters and is readily associated. Upper eye facets enlarged about twice the size of the lower ones, the area merging gradually with the lower area, densely pale brown hirsute. Ocellar tubercle prominent and situated well above the upper eye level; adorned with a patch of coarse decurved, black bristles. Fronto-clypeus more truncated at the insertion of the proboscis than in the female and the scape and pedicel darker, almost black; flagellum black. Palpi very short, barely reaching the base of the proboscis, the apical segment ovoid, shorter than the basal, covered with coarse black hairs. Proboscis but little longer than the height of the head. Beard pale yellow. Thorax more hirsute than in the female, the dorsal lines as plain. Legs unicolorous blackish-brown. Wings hyaline, with cell $R_5$ closed at the margin in both wings. No spur-veins.

The writer compared several females provided by L. L. Pechuman with the type of *albifrons* in Paris in 1953. The type agrees with variants of this species having closed cell $R_5$, basal

annulus of the flagellum longer than usual, moderately long palpi, yellow beard and body hairs, and reddish femora. It bears the label "Chile, Gay" and is intact except for a missing wing and antenna. There is unusual variation in some characters among females as noted by others, and Kröber (1930a) appears correct in considering as a synonym, *Pangonia subandina* Philippi, which the describer had differentiated only by the open cell $R_5$. This cell in series shows all intergradation from open and but little narrowed to closed and petiolate. Two specimens taken at the same time showed the closed condition in one, and in the other these cells are just closed at the margin in one wing and narrowly open in the other. There is a short spur-vein in one wing of each of two other specimens. The antennae and palpi may be brown or black. The latter are especially variable in shape showing graduations from short, blunt and very broad to narrow, and attenuated to a point at nearly one-third the length of the proboscis. The legs may be blackish, reddish, or bicolored with only the femora dark. These variations are not in constant combinations in series or specimens so as to suggest confusion of more than one species of the practicality of varietal establishment.

### Scione acer* Philip, new species

(= *S. incompleta* Kröber, 1930c, *nec* Macquart, 1845)

A dark species with blackish, pale margined notum, basally reddish abdomen, partially bicolored legs, and wings heavily fumose in the basal half.

*Holotype female*, 11 mm. Eyes with thick, blackish brown hair. Front convergent above, index 1:2.8, vertex black with three ocelli and with two marginal spots of pale brown pollen on either side of the median ocellus, a large median patch of blackish pollen, and below it to the subcallus, a narrower band of yellowish brown pollen, the whole covered with heavy black hairs. Subcallus dark brown, a paler spot on either side of the antennal fossae. Fronto-clypeus only moderately produced, length about equal to the height of the front, brown pollinose and pilose. Cheeks gray with a dense, white beard. Antennae brownish black with long black hairs on the two basal segments. Apical palpal segment reddish brown, rather short and broad, ratio of width to length as 1:2.7, attenuated to a point at little less than one-fourth the length of the proboscis. The latter is relatively short, a little less than the height of the head. *Thorax* including antealar tubercles and scutellum blackish, the usual anterior, two pale lines narrow and not extended beyond the sutures; covered with black hairs, a small patch of pale yellow ones on either shoulder, and a line of the same color from

* Latin, sharp or piercing.

above the wing bases to the outer corners of the scutellum. Pleura and chest dark brown with concolorous hairs and pale yellow tufts beneath the bases of the wings. Coxae and femora blackish with long, concolorous hairs, longest on the fore coxae; tibiae dark reddish brown with short, black hairs, no fringe on the hind pair which are almost as dark as the femora. Wings tinted on the outer halves with clouds on the cross-veins, more heavily fumose inward of both the stigma and cross-veins at the tips of the two basal cells; cells $R_2$ and $M_3$ closed and petiolate, vein $M_2$ weakened toward the margin in only one wing. "Knots" but no spur-veins are present. Subepaulets dark brown, bare. Halteres brown. *Abdomen* of the usual compact shape, reddish brown on the basal three segments, darkening caudad, mostly blackish haired, with pale yellow hairs over the entire venter, on the outer corners of the tergites, and forming an easily-rubbed dorso-median row of small, pale triangles.

*Holotype locality:* "Dept. Huanuro, Hcda. Exito, Peru, alt. 1150 m., IX–1936. Mrs. Y. Mexia, Collector." Van Dyke Collection.

Since *Pangonia incompleta* Macquart is the genotype of *Scione*, it is unfortunate that the type female (seen by the writer in Paris in 1953) was not studied by either Ricardo (1902) or Kröber (1930c), when each reviewed the species. A tendency in species of this group for vein $M_2$ (from the discal cell) adventitiously to fade before reaching the wing margin was the basis for Macquart's name.

The type female from "Colombie" also bears a MS label "fascipennis" and is intact except that the hairs of the beard and chest appear to have been eaten off by book lice. It is in almost exact agreement with a female I have from Bogota, Colombia. Compared to Kröber's description, *S. incompleta* female is a redder species including the entire antennae and legs, the palpi are brown and narrower, the front is wider below and more convergent above (index 1:1.19), the snout is a little longer than the height of the front, and the proboscis more than a third longer than the head, lines on the brown thorax are evident, the abdomen does not darken as much caudally and there are more yellow hairs on the thorax and abdomen. The wings are less strongly tinted basally and have stronger costal shadows beyond the stigma. It is evident that Kröber described the female of the present new species rather than the true *S. incompleta*.

As Schiner (1868) and Ricardo (1902) have pointed out, however, there is the further complication in assignment of the name that Macquart's original description was based more on a (now missing) very dark cotype male. The type male may eventu-

ally be found, but it is not likely to be the male of *S. acer* n.sp. since the abdomen is described as blackish without mention of lateral red.

*Scione distincta* (Schiner), from Colombia, is also a dark species with bicolored legs, but like *S. albifasciata* (Macquart) and *S. maculipennis* (Macquart), *S. distincta* has a more plainly lined thorax, and longer snout and palpi than *S. acer*. The types of all three of the foregoing species were seen by the writer in 1953.

**Tabanus (Macrocormus) rubricauda*** Philip, new species

A medium-sized, slender, reddish species with tinted wings, long spur-veins, and abdomen with median pale triangles inconspicuous or absent.

*Holotype female,* 12 mm. Eyes bare, unbanded (relaxed). Front narrow, slightly convergent below (index 1:5.7), dark yellow pollinose, a small blackish spot at vertex with a vestigial, median ocellus, the brown, basal callosity triangular and plainly separated from the ocular margins, prolonged above without sudden constriction into a narrowing dark brown, attenuated keel which reaches to the upper third of the front. Subcallus reddish, with yellow pollinosity. Fronto-clypeus grayish-yellow pollinose with sparse yellow hairs. Cheeks yellow pollinose with a short, pale yellow beard. Scape and pedicel red with short black hairs; flagellums missing (however, a broken one adherent to the body could well belong since it has somewhat the shape and color of related *T. sorbillans;* it has red plate and darker annuli, the two portions subequal in length, and the plate compact, subequal in width, and gently excavated, the tooth low but acute). Palpi deep yellow, long, slender, crescentic and blunt, covered with short black hairs. Proboscis fleshy, less than a fourth longer than the palpi. *Notum* and scutellum dark brownish black, unlined but with black and appressed yellow hairs. Pleura reddish with darker shadows, yellow pile predominating. Fore coxae grayish black with pale hairs; fore-femora blackish with concolorous hairs, the two hind pairs predominantly reddish with mostly yellow hairs and some dark brown ones basally; tibiae reddish, the fore pair brown on the apical half, hind-tibial fringe and most of the other hairs black. Wings distinctly tinted, deeper yellow in the costal cells and margining the outer radial and cross-veins; spur-veins about equal to stems, cells $R_5$ wide open. Subepaulets hairy. Halteres reddish. *Abdomen* dull reddish darkening caudad with red incisures, predominantly black-haired dorsally, entirely yellow-haired ventrally; the only evidence of small triangles (because of wear) is a small gray pollinose spot on the posterior margin of tergite 2 and a few yellow hairs on the median, hind margins of 5 and 6.

*Holotype locality:* "DEPT. HUANURO, HCDA. EXITO, PERU, alt. 1150 m., IX–1936. Mrs. Y. Mexia, Collector." Van Dyke Collection.

* Latin, red tail.

Paratype female, same data, in the collection of the author, is in close agreement but a little more worn, and the notum appears blacker. There is only a small black spot and no vestigial ocellus at the vertex, and again no evidence of original, abdominal triangles though scattering black hairs remain on tergites 3 and those following.

The species, though smaller and without abdominal triangles, is obviously related to *T. sorbillans* Wiedemann, the type of the subgenus *Macrocormus*. Other differences are the gradually tapered frontal keel, the darker notum and fore legs, black hind-tibial fringes, and (if correctly associated) more compact antennal plates. The darker fore legs, notum and scutellum, and tapered frontal keel also appear to separate this species from other related species in the subgenus.

TABANUS (TAENIOTABANUS) CARNEUS Bellardi

Three females taken by Ross and Michelbacher at "Puna I.," Ecuador, 6 May, 1951, show variation in abdominal pattern that deserves mention. Otherwise all three agree in structure, size, red coxae, femora and scutellums, dark, median, integumental spot on tergite 2, and frontal index of 1:4. Fairchild's figs. 24 and 25 (1942a) would illustrate the fronts of these. The eye patterns of all three (relaxed) lack the usual heavy, purple, upper band. One has the usual three broad, even, yellow longitudinal stripes on the abdomen, though the median one is more constricted on on tergite 2, and frontal index of 1:4. Fairchild's figs. 24 and specimens have patterns that, unaccompanied by the preceding female, would be difficult to associate here. The median lines are not as contrasting and are narrower, consisting of rows of truncated, connected triangles, a little widened on the hind tergal margins; the stripe would be even less distinct if the pale overlying hairs were worn off. The sublateral yellow lines also are not as distinct as in the first specimen and are composed of series of elongate, though mostly connected and even dashes. Other species with this type of median stripe such as *T. maya* Bequaert, differ in having more jagged sublateral lines and/or narrower fronts, or darkened legs basally and black scutellums.

*T. subsimilis* Bellardi from Mexico is a previously unidentified form of *lineola* of which the writer studied the type in Turin, Italy, in 1953. It is worn dorsally but intact and resembles the above two Ecuador variants in head characters, red-tipped scutel-

lum and median stripe, but the lateral stripes are jagged and the coxae and varying portions of the femora are blackish gray in the type. The writer has a Michoacán, Mex., female in close agreement with the type for comparison with the Ecuador *carneus*.

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*Addendum:* While this report was in press, study of the supposedly, long-lost type of *Agelanius meridianus* Rondani located in Naples, Italy, has revealed this to be unquestionably congeneric with *Chaetopalpus annulicornis* Philippi as discussed in a paper now in preparation. Recent information also affects the status of the subgenus *Veprius* mentioned in text.—C. B. P.

# NEW CALIFORNIA PLECOPTERA

STEPHEN HITCHCOCK
*University of California, Berkeley*

In the course of collecting stoneflies for the past several years in California the following new species have been discovered. I would especially like to acknowledge the help of Mr. Stanley G. Jewett, Jr., who kindly consented to examine this and other material.

## **Capnia quadrituberosa** Hitchcock, new species

*Male.*—Length of body 6.5 mm., general color in alcohol brown, in lighter colored specimens there appear a row of darker spots on each of abdominal tergites 1–8. Pronotum embossed. Wings of normal length, uniformly hyaline, venation typical of genus. First seven abdominal segments without special structures. Eighth tergite with membraneous area in distal half of sclerite and a pair of tubercules on posterior edge of sclerite. Ninth tergite with middle area membraneous except at extreme anterior margin, pair of prominent lobes directed posteriorly at distal margin of tergite. Tenth tergite membraneous medially. Supra anal process (epiproct) rather short, extending to posterior margin of ninth tergite, forked at tip, shaped as in figure 1.

*Female.*—Length of body 7.5 mm., general features typical of genus. Eighth abdominal sternite with posterior margin of subgenital plate slightly produced and with sclerotization as in figure 3.

This species appears closest to *Capnia umpqua* Frison but differs in the number and position of protuberances on the abdominal tergites. It also differs in the shape and size of the supra anal process. The nymphs of the two species appear very much alike.

*Holotype male* and allotype female and seven male and one female paratypes, SMALL STREAM TRIBUTARY TO FEATHER RIVER CROSSING ROUTE 40A NORTH OF OROVILLE, CALIFORNIA, January 22, 1955. The holotype and allotype have been deposited in the collection of the California Academy of Sciences, paratypes in the collections of the author and Stanley G. Jewett, Jr.

## **Leuctra divisa** Hitchcock, new species

*Male.*—Length 6 mm., general color in alcohol brown, head darker in color, pronotum patterned. General form and wing venation typical of genus. No processes on abdominal tergites. Ninth abdominal sternite with vesicle (ventral lobe), ninth sternite projecting posteriorly. Paraprocts (titillator) fused, extending obliquely up and back, slightly enlarged at distal end. Ninth tergite indented anteriorly. Tenth tergite indented on posterior margin and divided longitudinally. A pair of sclerites extending

in from base of each cercus and attached to posterior edge of tenth tergite by membraneous area. A pair of triangular shaped sclerites on each side of supra anal process. Supra anal process (epiproct) tucked underneath and behind tenth tergite. Cerci fairly long, lightly sclerotized, with numerous long hairs on outer surface.

This species probably represents a new subgenus in the genus *Leuctra*. It can be separated from other North American species by the presence of a vesicle, lack of processes on abdominal tergites, shape of cerci, shape of tenth tergite, and the fused paraprocts. The shape of the tenth tergite somewhat resembles that of *Leuctra infuscata* but the latter does not have the tenth tergite completely bisected and differs in several other respects.

Stanley G. Jewett, Jr., has informed me (personal communication) that he has a single female leuctrid from Lagunitas, Marin County, California, which may be the female of this species. It has a peculiar tongue-like protrusion of the sub-genital plate.

Further placing of this species will depend on new collections.

The holotype male is from WOODACRE, MARIN COUNTY, CALIFORNIA, April 14, 1956, and has been deposited in the collection of the California Academy of Sciences.

### Nemoura marionae Hitchcock, new species

*Male.*—Length of body 6 mm. Scape and pedicel light colored, rest of antennae dark, labrum light with sides dark, color pattern of head varying between specimens, pronotum with dark longitudinal band on each side of midline, prescutum of mesothorax dark on anterior edge, mesonotum with dark band on each side of midline which has a light colored triangular spot with its apex reaching the posterior margin and base resting on anterior margin; metanotum dark with light stripe on midline, abdomen light brown; femora with dark band just before distal end, tibia with dark band at proximal end; last two tarsal segments dark. Remnants of two pairs of cervical gills. Wings hyaline. Vesicle (ventral lobe) at base of ninth sternite. Genitalia as in figures 6 and 7; lobe present at base of cercus; supra anal process (epiproct) membraneous at tip with a roughly triangular shaped sclerotized piece with a notch at apex; paraprocts (subanal lobes) curved with an included pocket and roughened edge at tip, figure 9.

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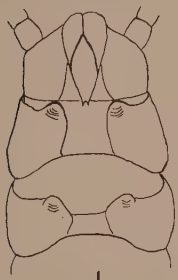
### EXPLANATION OF FIGURES

Fig. 1, *Capnia quadrituberosa* male genitalia, dorsal. Fig. 2, *Capnia quadrituberosa* male genitalia, lateral. Fig. 3, *Capnia quadrituberosa* female eighth sternite, ventral. Fig. 4, *Leuctra divisa* male genitalia, lateral. Fig. 5, *Leuctra divisa* male genitalia, dorsal. Fig. 6, *Nemoura marionae* male genitalia, lateral. Fig. 7, *Nemoura marionae* male genitalia, dorsal. Fig. 8, *Nemoura marionae* female sternites. Fig. 9a and b, *Nemoura marionae* subanal lobes of male paratypes.



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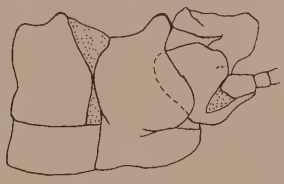

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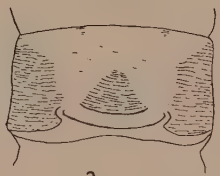

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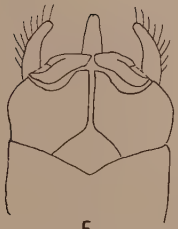

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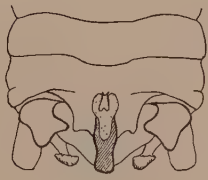

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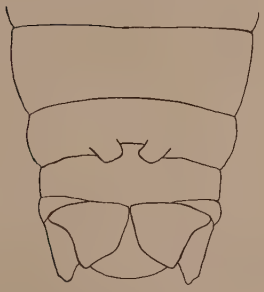

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*Female.*—Length of body 8 mm., general shape and color as in male. Eighth sternite with two short truncate lobes as in figure 8.

The female genitalia appears somewhat like that of *Nemoura venusta* Banks and so would be in the subgenus *Amphinemura* Ris. However, the male has a lobe at the base of the cercus as in the subgenus *Malenka* Ricker. There seems to be a more definite color pattern than in many *Nemoura* but the exact pattern will vary between specimens.

The male epiproct sometimes may be withdrawn down and in so that it is not visible.

This species has been found only by a small brook emerging from a spring and flowing into Sagehen Creek near Hobart Mills, California. Although no specimens were found mating in nature, a live male and female placed in a large bottle assumed the mating position in a very short time. There were no other *Nemoura* with branched cervical gills present at the time. The male holotype was captured August 9, 1955 and the female allotype, July 26, 1955. The holotype and allotype will be placed in the collection of the California Academy of Sciences. Paratypes collected July 26, 1955 and August 9–10, 1955 are in the collections of Dr. William E. Ricker, Mr. Stanley G. Jewett, Jr., and the author.

In addition to the above new species, it may also be of interest to record the following species found in California for the first time:

*Nemoura producta* Claassen was collected in Marin County north of San Francisco and this would appear to be the southern most extension of its distribution down the Coastal Range of California from the Coast and Cascade Mountains to the north.

*Alloperla delicata* Frison was captured in Sierra County and although this is its first recorded capture in California, it has been found in nearby states.

*Capnia columbiana* Claassen collected in Nevada County also has a distributional range of nearby states.

*Capnia lineata* Hanson was collected by Jon Herring in Santa Clara County. This species, identified by Mr. Stanley G. Jewett, Jr., represents the first specimens collected since the types. It was known previously only from Idaho.

# CRYPTOGNATHUS STERNALIS, A NEW SPECIES OF PROSTIGMATID MITE FROM OREGON

(Acarina: Cryptognathidae)

G. W. KRANTZ

*Oregon State College, Corvallis*

The genus *Cryptognathus* was erected in 1879 by Kramer, with *C. lagena* Kramer named as the type species. In 1902, Oudemans removed the genus from the family Raphignathidae, in which he had placed it in 1893, and made *Cryptognathus* the type genus of the new family Cryptognathidae. Berlese (1916) subsequently described a second species, *Cryptognathus cucurbitae*, and the subspecies *C. cucurbitae* var. *subnitida*.

Baker and Wharton (1952) diagnose the cryptognathids as follows: Small, scarlet red mites measuring from 300 to 400 microns in length; body oval in shape and lacking a suture between propodosoma and hysterosoma; dorsum with a net-like skin pattern, and skin punctate; chitinous extensions of the propodosoma forming a tube which is open ventrally and through which the gnathosoma can be extruded or withdrawn; chelicerae shear-like; chelae small and almost straight, untoothed, and sharp for piercing; genital suckers absent.

In August of 1956, the writer received from Everett C. Burts, research assistant in the Department of Entomology at Oregon State College, a series of mite specimens collected in rotting plant debris at The Dalles, Oregon, on March 28, 1956. Among these specimens was a single cryptognathid mite which, upon examination, proved to be a previously undescribed form.[1]

The new species may be distinguished from the other members of the genus through the use of the following key:

1. Dorsum of idiosoma with net-like skin pattern covering only the lateral edges; length 300 microns; found in Italy, and in nest of *Sciurus n. niger* in Florida.....*Cryptognathus cucurbitae* Berlese
– Net-like skin pattern covering the dorsum of the idiosoma.....2
2. Skin pattern obsolete; length 265 microns; found in Africa.....*Cryptognathus cucurbitae* var. *subnitida* Berlese
– Skin pattern distinct; body of a length greater than that mentioned above.....3
3. Rostral prolongation hyaline; length 350–400 microns; found in moss in Europe.....*Cryptognathus lagena* Kramer
– Rostral prolongation deeply sculptured; length 340 microns; found in rotting plant debris in Oregon.....

[1] Six additional females taken from an oak treehole in Corvallis, Oregon, on February 4, 1958, were examined prior to the publication of this paper.

.....*Cryptognathus sternalis* Krantz, new species

## Cryptognathus sternalis Krantz, new species

(Figs. 1 and 2)

*Female.*—Oval in form, the widest point being slightly posterior to coxae IV. Total body length, including the extruded gnathosoma, measures 489 microns. Idiosomal length about 340 microns. Greatest width measures 218 microns. *Dorsum* (Fig. 1) *Idiosoma* with a dorsal plate which does not cover completely the lateral and posterior extremities of the dorsum (secondary extension posteriorly may be result of mounting procedure); with a distinct net-like pattern over its entire surface; strongly punctate. Rostral extension truncate, measuring 78 microns long and 78 microns wide at its base; curving ventrally but open on the ventral aspect; rostral plate deeply sculptured, the identations of the pattern being oval or reniform in shape. A pair of short setae (20 microns) inserted immediately behind the posterior border of the sculptured area. Two pairs of eyes located at the ends of a crescentic ridge lying in a transverse position on a line between the insertions of coxea II and III; two pairs of setae inserted anterior to the ridge and directly interior to the eyes; with a small blunt protuberance of unknown function between and anterior to the insertions of the abovementioned setae. Seven pairs of dorsal and one pair of lateral setae. Insertions of dorsal setae, as well as those of the venter and appendages, noticeably raised. Lateral and posterior marginal areas scalloped, weakly folded. *Anus* posterior; protected dorsally by a pair of triangular plates on each of which is inserted one dorsal and one lateral seta. *Gnathosoma* (Figs. 1 and 2c) long, measuring 218 microns from its base to the tip of the capitulum; sharply divided at points of insertion of the chelicerae. *Capitulum* spear-shaped; with a pair of incurved terminal structues, each of which is flanked by a short lateral seta. Lateral to base of capitulum are inserted the six-segmented *palpi*, measuring 103 microns in length; terminal segment small and bluntly pointed; palpal tibia with at least three setae, the external being the longest; at least two setae located on palpal genu, palpal femur with one, and trochanter with two, dorsal setae. Basad of the palpal insertions are a pair of short club-like organs (Fig. 2c) which may be sensory in function. *Chelicerae* inserted midway between the base and terminal end of gnathosoma; with sharp smooth chelae making up one-third of the total cheliceral length of 113 microns; distal half of chelicerae weakly sculptured. A pair of *spiracular openings* located between the insertions of the chelicerae, with the peritremes forming an arch behind them. *Venter* (Fig. 2a) *Idiosoma* punctate ventrally; with net-like pattern confined to the anterior and posterior portions of the venter, and to the extreme lateral margins. Punctate pattern absent on median anterior portion of the idiosoma; with apodemal remnants of coxae II and III bordering the non-punctate area; median anterior portion flanked anteriorly by a pair of setae inserted between its lateral anterior elongations (Fig. 2b); with a pair of short spine-like processes external and posterior to the abovementioned setae, and a series of short sensory setae or setal processes located along the posterior incurved border. *Genital* opening near the posterior border of idiosoma; covered by two plates, along the anterior border of which are

inserted three pairs of genital setae; with a pair of outlying setae inserted laterad of the most posterior pair of genital hairs. *Anal opening* with a pair of lateral ventral plates, each bearing a single seta. Five pairs of primary ventral setae present, the most anterior pair inserted internally to smooth sternal area; second pair located internally to coxae IV; third pair behind and slightly external to first; fourth pair internal to second and noticeably shorter than the latter; fifth pair inserted immediately anterior to the sculptured posterior portion of the idiosoma. Three pairs of lateral

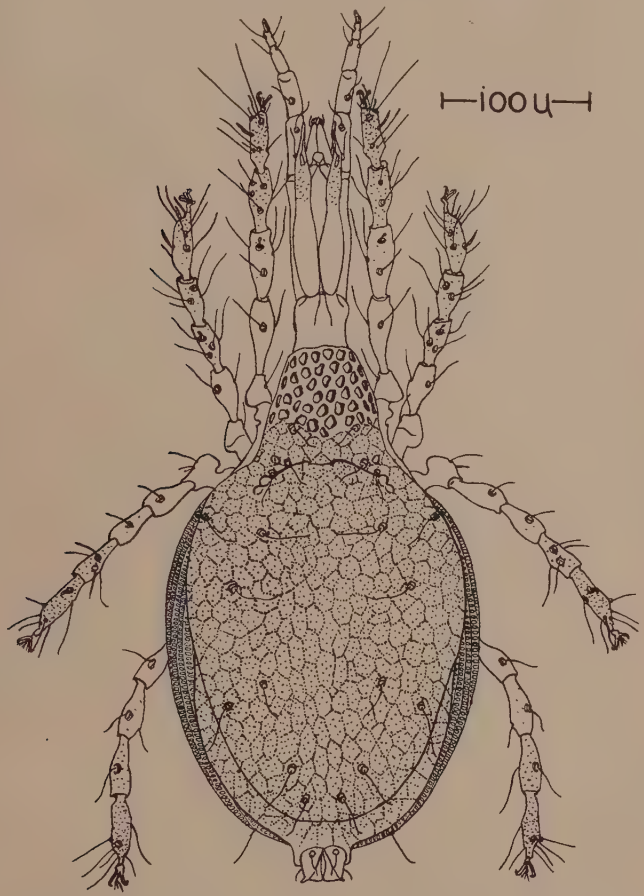


Fig. 1. *Cryptognathus sternalis*, dorsal view of female with gnathosoma extruded.

posterior sensory pores present, the most posterior pair lateral and external to the fourth pair of primary setae. Two pairs of pore-like structures located externally and behind the second pair of primary setae. *Legs* (Fig. 1) All tarsi with well developed claws and a haired empodium; distal segments of all legs noticeably sculptured, with the pit-like markings disappearing toward the insertions of these appendages. Tarsus I with twelve setae, two of which are long sensory hairs (49 microns) inserted adjacent to each other on the dorsal distal portion; with a shorter rod-like hair inserted dorsolaterally on the median external portion. Tibia I with seven setae, one of which has a ventral position; with two dorsal distal hairs, the external nearly twice the length of the internal hair. Five setae located on genu I; with a short knobbed sensory organ inserted toward the dorsal distal end of the segment. Femur I with three setae, one being ventrally inserted. Trochanter I swollen externally and bearing a single seta on its lateral internal aspect. Length of leg I, 222 microns. Tarsus II with ten setae, none of which are as long as the sensory setae on tarsus I; with a rod-like hair inserted dorsolaterally on the median external portion. Tibia II with six setae, the single ventral hair occupying a position similar to that of the ventral setae on the following segments. Genu II with four hairs, two of which are dorsal in insertion; with a knobbed sensory organ similar to that on genu I. Femur II and trochanter II resembling femur and trochanter I, except for their somewhat shorter combined length. Length of leg II, 185 microns. Tarsus III with eight setae, and a rod-like sensory hair on the dorsal aspect. Five setae inserted on tibia III, the two ventral hairs exceeding the others in length. Genu and femur III each with two setae; with one inserted dorsally and one placed ventrally on each segment. Trochanter III swollen externally; with a ventral and a dorsal seta. Length of leg III, 195 microns. Tarsus IV with seven setae and a short dorsal hair approximating in insertion and length the rod-like hair on the preceding tarsi. Tibia IV with two setae, one inserted dorsally and the other ventrally. Trochanter IV not quite as swollen as those of preceding legs; with no setal insertions. Length of leg IV, 234 microns.

## Discussion

Probably the most interesting morphological feature of this unusual acarid is the presence of a well-defined sternal area which resembles, in some respects, the sternal plate of the more primitive mesostigmatid mites. The sternal area of *C. sternalis* apparently is not a true plate but a symmetrical region lacking the punctate markings distributed generally over the remainder of the venter. However, it appears possible that this entity may be a remnant of a true sternal plate. Not only is there a definite resemblance to the mesostigmatid sternal plate in shape and disposition, but setal homologies could easily be assumed, especially when comparing the sternal area in question with the sternal plates of nymphs of various parastid and other gamasid mites.

*Holotype female*, The Dalles, Oregon, in rotting plant debris

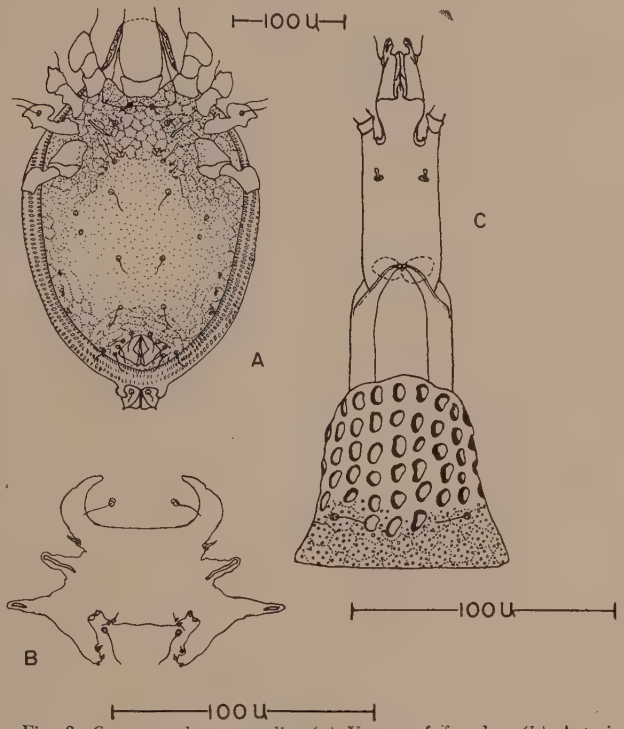


Fig. 2. *Cryptognathus sternalis, (a)* Venter of female; *(b)* Anterior sternal area; *(c)* Dorsal view of gnathosoma with chelicerae removed.

under cherry trees on March 28, 1956, collected by E. C. Burts, will be deposited in the collection of the U. S. National Museum in Washington, D.C.

The drawings were made and data was collected with the aid of a Spencer phase contrast microscope equipped with dark medium contrast objectives and illuminated by a Spencer advanced laboratory illuminator.

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## THE SMOKE FLY, HORMOPEZA COPULIFERA MELANDER
(Diptera: Empididae)

During the summer of 1957 I collected flies at many localities in the Pacific Northwest during a trip to Alaska. Although I was chiefly concerned with the Platypezidae, and in this connection tried for *Microsania* (the genus of platypezid smoke flies) at various places where a fire could be safely built, time and again after I had swept my net through the smoke I found that I had strained out specimens of an empidid along with the microsanias. I presumed that they belonged to a species of *Hormopeza*, but they were much larger than the specimens of *Hormopeza brevicornis* Loew that I had previously swept from smoke in California (Kessel, Pan-Pac. Ent., 28:56–58. 1952).

The flies proved to belong to *Hormopeza copulifera* Melander (Gen. Insect. Diptera, Fam. Empididae, p. 96. 1927). This seems to be the largest known species of the genus, and may attain a length of 5 mm. or more. The species was described from material collected at Coeur d'Alene, Idaho, August 24, 1916. Paratypes were from Idaho, Washington, Alberta, and Alaska. This species has not been reported from smoke. The data indicate that most of the specimens taken heretofore have been captured on windows.

I collected *H. copulifera* from smoke at the following localities: Spenard, Alaska (Aug. 22); Ten Mile Creek, M.P. 813, Alaska Highway, Yukon Territory (Aug. 31); Rancheria, M.P. 710, Alaska Highway, Y.T. (Aug. 31); Watson Lake, M.P. 632, Alaska Highway, Y.T. (Sept. 1); Glacier National Park, Montana (Sept. 6). The flies were numerous and in some instances outnumbered the *Microsania* specimens. On one occasion they were encountered when no microsanias were taken.

Because so many empidids are notorious predators, I suspected at first that the hormopezas collected in smoke with microsanias at Mill Valley, California, were present to prey on the latter flies. But as indicated in my 1952 note, there was no evidence of such predation by *H. brevicornis* on that occasion. Likewise, no such evidence was obtained for *H. copulifera* in 1957.

The first species of *Hormopeza* to be associated with smoke was *H. obliterata* Zetterstedt, a European form. This was reported to be a smoke fly by Sharp (Ent. Monthly Mag., 54:244, 1918). —EDWARD L. KESSEL, *University of San Francisco and California Academy of Sciences.*

# SOME PARASITES AND PREDATORS OF FRUIT PESTS IN THE PACIFIC NORTHWEST

E. J. NEWCOMER[1]

*Entomology Research Branch, Agricultural Research Service, U.S.D.A., Yakima, Washington*

For more than forty years the Department of Agriculture's fruit insects laboratories in the Pacific Northwest have been collecting information on the parasites and predators of insects and mites of economic importance. Specimens were collected or reared at Wenatchee, Washington, from 1914 to 1916, in the area around Portland, Oregon, in 1917 and 1918, and at Yakima, Washington, since that time. About 90 species have been determined, many of them new to science at the time they were collected. The determinations were made by specialists in the Department of Agriculture and the U.S. National Museum, including Banks, Caudell, Cushman, Gahan, Girault, Heidemann, Knab, Muesebeck Rohwer, Sabrosky, Sailer, Schwartz, and Walton.

These parasites and predators are listed below under each host in the order in which they commonly appear in systematic lists. Life history and other data have been published for some of these beneficial insects, and reference is made at the appropriate places to such publications.

Acarina (including *Bryobia proetiosa* Koch., *Metatetranychus ulmi* (Koch), *Eotetranychus carpini borealis* (Ewing), *Tetranychus mcdanieli* McG., and *T. telarius* L.) The occurrence and abundance of predators are discussed in *(10)*.

*Conwentzia* sp. Coniopterygidae. Clark County, Wash.

*Scolothrips sexmaculatus* (Perg.). Thripidae, Yakima, Wash.

*Typhlodromus* spp. Phytoseiidae. Also called *Seius* in older literature.

*Mediolata mali* (Ewing). Raphignathidae. Yakima.

*Orius insidiosus* (Say). Anthocoridae. Yakima.

*Stethorus picipes* Casey. Coccinellidae. Yakima.

*Androloma mac-cullochi similis* (Stretch.) Forester moth.

*Gravenhorstia* sp. Ichneumonidae. Wenatchee, Wash.

*Ametastegia glabrata* (Fall.). Dock sawfly. Parasites and percentage of parasitization mentioned in *(4)*.

*Eurytoma* sp. Eurytomidae. May be secondary. Wenatchee.

[1] Retired.

*Trichogramma minutum* Riley. Trichogrammatidae. Egg parasite. Wenatchee.

The following ichneumonidae, all from Wenatchee: *Mastrus smithii* (Pack.) Cush. and *Hoplocryptus notatus* (Prov.), *Cubocephalus canadensis* (Prov.), *Scambus pterophori* (Ashm.), *Hympamblys albopictus* (Roh.), *Cubocephalus erythropus velox* (Cress.), and *Bathythrix claviger* (Tasch.).

*Anacampsis fragariella* Busck. Western strawberry leafroller.

*Agathis cincta* (Cress.). Braconidae. Northport, Wash.

*Aphididae* (including *Anuraphis roseus* Baker, *Aphis cerasifoliae* Fitch, *A. pomi* Deg., *Hyalopterus arundinis* (F.), *Macrosiphum artemisiae* (Fonsc.), *Monellia caryae* (Monell), *Myzus cerasi* (F.), and *M. persicae* (Sulz.). Some of the predators listed below are discussed in *(7)*.

*Chrysopa plorabunda* Fitch. Chrysopidae, Wenatchee.

*C. majuscula* Banks. Chrysopidae. Salem, Oregon.

*Kimminsia disjuncta* (Banks). Hemerobiidae. Salem, Oregon.

*Anthocoris borealis* Dallas. Anthocoridae, Wenatchee.

*Camptobrochis brevis* Uhl. and *C. nebulosus* Uhl. Capsidae. Wenatchee.

*Podabrus tomentosus* (Say). Lampyridae. Wenatchee.

*Metasyrphus arcuatus* (Fall.) and *Syrphus opinator* O.S. Syrphidae. Wenatchee.

*Lasiophthicus pyrastri* (L.) Syrphidae. Wenatchee.

The following Coccinellidae, all from Wenatchee: *Adalia annectans* Cr., *A. bipunctata* (L.), *Coccinella 5-notata* Kby., *C. 9-notata* Hbst., *Cycloneda sanguinea* (L), *Hippodamia convergens* Guer., *H. lecontei* Muls., *Hyperaspis* sp., and *Scymnus lacustris* LeC.

*Aphis gossypii* Glov. Melon aphid.

*Aphidius (Lysiphlebus) testaceipes* (Cress.). Braconidae. Wenatchee.

*Arachnida*. Spiders.

*Tromatobia rufopectus* (Cress.). Ichneumoidae. Egg predator parasite. Wenatchee.

*Archips argyrospila* (Wlk.). Fruit-tree leaf roller.

*Podisus modestus* Dall. Pentatomidae. Wenatchee.

*Stomatolydella infernalis* Tns. Larvaevoridae. Kennewick, Wash.

*Aplomya caesar* (Ald.). Larvaevoridae. Kennewick and Wenatchee.

The following ichneumonidae: *Horogenes pterophorae* (Ashm.), *Horogenes eureka* (Ashm.), and *Itoplectis 4-cingulatus* (Prov.), from Wenatchee, and *Exochus* sp. from Kennewick.

*Archips rosaceana* (Harr.). Oblique-banded leaf roller.

*Glypta simplicipes* Cress. Ichneumonidae. Ellensburg, Wash.

*Ascogaster quadridentata* Wesm. Codling moth parasite. See *(9)*.

*Perilampus fulvicornis* Ashm. Parilamidae. Yakima.

*Kimminsia disjuncta* (Banks). Brown lacewing.

*Anacharis sp.* Figitidae. Salem, Oregon.

*Carpocapsa pomonella* (L.). Codling moth. Introduction of parasites discussed in *(9)*.

*Ascogaster quadridentata* Wesm. and *Agathis conspicuus* (Wesm.) Braconidae. Introduced into the Yakima Valley.

*Mastrus pilifrons* (Prov.) Ichneumonidae. Wenatchee.

*Pimpla sanguinipes* Cress. Ichneumonidae. Yakima.

*Scambus hispae* (Harr.) Ichneumonidae. Wenatchee.

*Trichogramma minutum* Riley. Trichogrammatidae. Egg parasite. Wenatchee and Yakima.

*Chrysopidae*. Lacewings.

*Isodromus niger* Ashm. Encyrtidae. Yakima County.

*Keonolla confluens* (Uhler). Sharpshooter.

*Ufens niger* (Ashm.). Trichogrammatidae. Yakima.

*Coccinella 5-notata* Kby. Lady beetle.

*Tetrastichus melanis* Burks. Eulophidae. Wenatchee.

*Conwentzia* sp. Dusty wing.

*Dendrocerus conwentziae rufus* Gahan. Ceraphronidae. Clark County, Wash.

*Corythucha spp.* Lacebugs.

*Podisus modestus* (Dall.). Pentatomidae. Clark County.

*Orius tristicolor* (White). Anthocoridae. Clark County.

*Perilitus sp.* Lady beetle parasite.

*Nabis ferus* L. Nabidae. Wenatchee.

*Epicallima coloradella* Walsh. Scavenger moth.

*Idechthis* sp. and *Itoplectis 4-cingulatus* (Prov.) Wenatchee.

*Eriosoma lanigerum* (Hausm.). Woolly apple aphid. Predators discussed in *(7)*. Introduction of *Aphelinus* discussed in *(1)*, *(2)*, *(3)*, *(6)*, *(7)*, *(12)*, and *(13)*.

*Chrysopa plorabunda* Fitch and *C. majuscula* Banks. Chrysopidae. Wenatchee.

*Camptobrochis nebulosus* Uhl. Capsidae. Wenatchee.

*Adalia bipunctata* (L.) and *Coccinella 5-notata* Kby. Coccinellidae. Wenatchee.

*Aphelinus mali* (Hald.). Eulophidae. Introduced into Pacific Northwest.

The following Syrphidae, all from Wenatchee: *Eupeodes volucris* O. S., *Metasyrphus arcuatus* (Fall.), *Syrphus opinator* O. S.., and *Scaeva pyrastri* (L.).

*Lithophane* spp. Green fruitworms.

*Apanteles* sp. Braconidae. Yakima.

*Gymnonychus californicus* Marl. Pear leafworm. Percentage of parasitism mentioned in *(11)*.

*Cleptes provancheri Aaron* (?). Cleptidae. Wenatchee.

*Hippodamia convergens* Guer. Convergent lady beetle.

*Perilitus* sp. Braconidae. Wenatchee and Yakima.

*Hyphantria cunea* (Drury). Fall webworm.

*Habrocytus* sp. Pteromalidae. Portland.

*Lithocolletis crataegella* (Clemens). Apple leaf blotch miner.

*Sympiesis rex* Grlt. Eulophidae. Salem, Oregon.

*Lithocolletis tremuloidiella* (Braun). Aspen blotch miner.

*Sympiesis* sp. Eulophidae. Spokane.

*Zotheca tranquilla* Grote. Stalk borer.

*Hypopteromalus percussor* Grlt. Pteromalidae. May be secondary. Wenatchee.

*Glypta simplicipes* Cress. and *Scambus alboricta* (Cress.). Ichneumonidae. Wenatchee.

*Malacosoma pluviale* (Dyar). Western tent caterpillar.

*Rogas* sp. Braconidae. Clark County.

*Hypopteromalus percussor* Grlt. Pteromalidae. May be secondary. Wenatchee.

*Hyposoter fugitivus pacificus* Cush. Ichneumonidae. Wenatchee.

*Pachynematus* sp. Sawfly

*Ctenochira extricata* (Davis). Ichneumonidae. Wenatchee.

*Pandemis pyrusana* (Kearf.) Pandemis moth. Parasitism mentioned in *(8)*.

*Nemorilla floralis* (Fall.). Laraevoridae. Yakima County.

*Horogenes* sp. Ichneumodiae. Yakima County.

*Papilio bairdii oregonia* Edw. Swallowtail.

*Apanteles lunatus* (Pack.). Braconidae. Wenatchee.

*Phalaenids*. Cutworms. Discussion of digger wasp and its inquilines in *(5)*.

*Podalonia luctuosa* (Smith). Sphecidae. Yakima.

The following Sarcophagidae live as inquilines on the sphecid larvae: *Hilarella hilarella* (Zett.), *Metopia leucocephala* (Rossi) and *Taxigramma heteroneura* Mg.

*Phenacoccus* sp. Mealybug.

*Lygocerus* sp. Ceraphronidae. Hyperparasite. Yakima County.

*Tarhopalus sheldoni* Ashm. Encyrtidae. Okanogan County, Wash.

*Psylla pyricola* Foerst. Pear psylla.

*Anthocoris borealis* Dallas. Anthocoridae. Entiat, Wash.

*A. musculus* (Say). Anthocoridae. Yakima County.

*Nematus mendicus* Walsh. Cottonwood sawfly.

*Ctenochira* sp. Ichneumonidae. Yakima.

*Rhagoletis cingulata* (Loew). Cherry fruit fly.

*Trybliographa* sp. Figitidae. Salem, Oregon.

*Sanninoidea exitiosa graefi* (Hy. Edw.). Peach tree borer.

*Cryptus tejonensis* Cress. Ichneumonidae. Clark County.

*Scolytus rugulosus* (Ratz.). Shot-hole borer.

*Cheiropachus colon* (L.), and *Rhaphitelus masculatus* Wlk. Pteromalidae, Yakima.

*Spilonota ocellana* (D. and S.). Eye-spotted bud moth.

*Horogenes pterophorae* Ashm. Ichneumonidae. Wenatchee.

*Agathis annulipes* (Cress.) Braconidae. Wenatchee.

*Syrphids*. Syrphus flies.

*Diplazon tibiatorius* (Thumb.), *D. pectoratorius* (Thumb.), *Syrphoctonus decoratus* (Cress.), and *S. maculifrons* (Cress.). Ichneumonidae. Wenatchee.

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## COLLOQUIUM ON ZOOLOGICAL NOMENCLATURE TO BE HELD IN LONDON IN JULY, 1958 IN CONNECTION WITH THE FIFTEENTH INTERNATIONAL CONGRESS OF ZOOLOGY

It is hoped that at the Fifteenth International Congress of Zoology to be held in London in July, 1958 it will be possible for that Congress finally to approve and adopt the new text of the International Code for Zoological Nomenclature as revised by the preceding Congresses held in Paris in 1948 and Copenhagen in 1953. As arranged at the Copenhagen Congress, a draft of the revised text will be submitted for this purpose to the London Congress.

In order to assist the Congress in the examination of the draft of the revised Code and to provide ample opportunity for the discussion of the questions involved, arrangements have been made between the Secretariat-General of the Congress and the International Trust for Zoological Nomenclature under which a Colloquium on Zoological Nomenclature is being organised by the International Trust on the lines of the Colloquium organised by that body in connection with the Copenhagen Congress.

The Colloquium will open on Wednesday, the 9th July, i.e. one week prior to the opening of the London Congress. It is hoped that this body will be able to relieve the Congress of the bulk of the work involved in the scrutiny of the draft of the revised Code and will be able to submit to the Congress agreed recommendations as to the text to be adopted. Invitations to the Colloquium have already been issued by the Trust to a large number of zoologists known to be interested in zoological nomenclature. In addition, arrangements have been made between the Trust and the Secretariat-General of the Congress under which an invitation to the Colloquium will be issued by the Trust to any member of the Congress who expresses a desire to take part in its discussions but who has not as yet received a separate invitation.—FRANCIS HEMMING. *Managing Director and Secretary, International Trust for Zoological Nomenclature and Secretary to the International Commission on Zoological Nomenclature.* September, 1957.

# NEW WESTERN TRICHOPTERA

D. G. DENNING
*Walnut Creek, California*

Collections of caddisflies examined recently have disclosed several undescribed forms which show some interesting modifications and relationships to presently known species. As is often characteristic of the western montane fauna several of the new species belong to closely related species complexes. The Trichoptera described herein are from Washington, California, Idaho and Alberta. I am deeply indebted to Dr. C. P. Alexander of the University of Massachusetts, Mr. Borys Malkin, University of Washington, and Mr. D. L. Abell for sending me material used in this paper. Unless indicated otherwise types of the new species are in the writer's collection.

## **Agapetus cornuta** Denning, new species

This, the twenty-fifth Nearctic species described in the genus can easily be distinguished from other species by the large acute horn-like processes of the tenth tergite. Approximately half of the known species occur in the western montane region.

*Male.*—Length 5 mm. General color of body, legs and antennae dark brown, wings fulvous. Fifth sternite with the usual concentric organ; mesal process of sixth sternite peg-like and directed caudad. *Genitalia* as in fig. 1. Ninth segment annular, ventral portion about twice width of the narrowed dorsal part. Tenth tergite consists of a pair of divergent heavily sclerotized plates, connected basally by a membranous sheath, fig. 1B; each lateral lobe narrow, the dorsal margin curved sharply near apex as a prominent acuminate prong, apex broadly triangular and directed caudad, best seen from lateral aspect, fig. 1A. Cerci from dorsal view, fig. 1B, narrowed apically, arising from ventral portion of tenth tergite and about half its length; from lateral aspect dorsal and ventral margins parallel, apex truncate. Clasper broadened distally, dorso-distal corner sub-triangular, about midway the length of dorsal margin a small slender spine arises from mesal surface and projects mesad; ventro-distal corner obtuse, when viewed from ventral aspect mesal margin of apex dentate, tip dark brown in color.

*Holotype male*, KLICKITET CREEK, NEAR GOLDENDALE, WASHINGTON, Aug. 28, 1952, D. G. Denning.

## **Wormaldia lacerna** Denning, new species

This, the twelfth Nearctic species, is a member of the Moesta Group, which contains the following three Nearctic species: *gabriella, moesta* and *lacerna. Gabriella*, fig. 4, which possesses a long wide tongue-like mesal process on the seventh abdominal sternite

and one of variable lengths on the eighth, fig. 4B, is a western species known to extend eastward at least to Churchill, Manitoba, and Western South Dakota; for comparison to *lacerna* the male genitalia are figured. The new species, *lacerna,* possesses a short mesal process on the seventh and none on the eighth sternite and is at present known only from the northwestern United States. The third Nearctic species, *moesta,* is known only from eastern Canada and the United States and possesses a long slender mesal process on both the seventh and eighth sternites.

*Male.*—Length 7 to 8 mm. General color of head, thorax and wings fulvous, legs, spurs and antennae flavescent. Forewings with $R_2$ absent, as in *gabriella.* Mesal process of seventh sternite slender and short, extending beyond margin no longer than half the width of the sternum, fig. 2C, eighth sternum with scarcely any indication of a mesal process. *Genitalia* as in fig 2. Ninth segment annular, considerably narrowed dorsally, ventral portion produced caudad almost as far as apex of tenth tergite. Cerci digitate, slender throughout, apex subacute, fig. 2A. Tenth tergite typical for genus, undivided, carcinate and tapering to an acute apex extending caudad practically as far as apex of cerci, fig. 2B. Basal segment of clasper longer than wide, in the shape of a parallelogram; apical segment constricted near base, expanded distally with apical margin circular and directed caudo-dorsad. In this latter respect it bears some similarity to *gabriella* Banks.

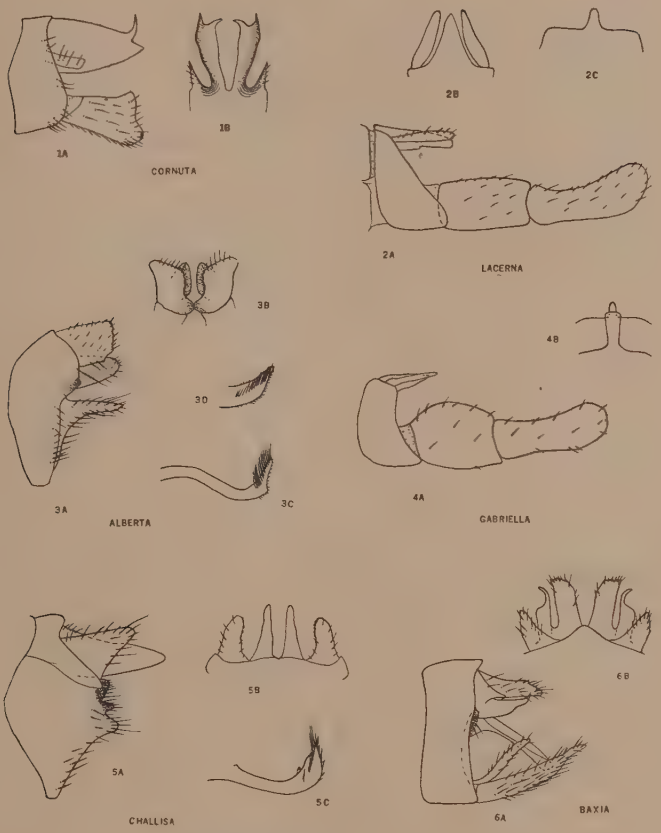
*Holotype male,* SATUS CREEK, NEAR GOLDENDALE, WASHINGTON, Oct. 2, 1952, D. G. Denning. *Paratypes,* two males, same data as for holotype.

### WORMALDIA OCCIDEA (Ross)

1938. *Wormaldia cruzensis* (Ling). Pan-Pacific Ent., 14:64, *New Synonymy.*

In the Collection of the California Academy of Sciences a collection of Wormaldia containing four males and two females, apparently collected in the same series as the holotype *cruzensis* from Felton, Santa Cruz County, California, was recently examined. These specimens were found to be identical to the type *cruzensis* which is in the Collection of the California Academy of Sciences, San Francisco. A study of *cruzensis* indicates that it is a synonym of *occidea* Ross.

In Ross' study of the Philopotamidae in his monumental "Evolution and Classification of the Mountain Caddisflies" the *Wormaldia* are divided into various Groups. The Anilla Group contains this and a half dozen additional Nearctic species. *Wormaldia anilla* and *occidea* are very closely related and in some specimens separation is difficult largely because the mesal process




## Explanation of Figures

Fig. 1. *Agapetus cornuta,* male genitalia; 1A, lateral aspect; 1B, tenth tergite and cerci, dorsal aspect. Fig. 2. *Wormaldia lacerna,* male genitalia: 2A, lateral aspect; 2B, tenth tergite, dorsal aspect; 2C, eighth sternum. Fig. 3. *Limnephilus alberta,* male genitalia; 3A, lateral aspect; 3B, cerci and tenth tergite, dorsal aspect; 3C, lateral arm of aedeagus; 3D, lateral arm of aedeagus, apex, mesal surface. Fig. 4. *Wormaldia gabriella,* male genitalia; 4A, lateral aspect; 4B, seventh and eighth sternum. Fig. 5. *Limnephilus challisa,* male genitalia; 5A, lateral aspect; 5B, cerci and tenth tergite, dorsal aspect; 5C, lateral arm of aedeagus. Fig. 6. *Lepidostoma baxea,* male genitalia: 6A, lateral aspect; 6B, tenth tergite and cerci, dorsal aspect.

of the seventh sternum is variable in size. In the "*cruzensis*" specimens from Santa Cruz County, California, the mesal process of the seventh sternum is considerably shorter than found in specimens from other western localities which have been examined by the writer.

**Limnephilus alberta** Denning, new species

This species can be distinguished from others in the genus by the short massive cerci, reduced plate-like tenth tergite lobes, and the slender apically acute lateral arm of the aedeagus.

*Male.*—Length 16 mm. Head and thorax dark brown, antennae, legs and palpi yellowish, spurs 2–3–4. Wings dark brown with darker mottling along veins, irrorate with clear markings. Front basitarsus distinctly longer than second segment. Eighth tergite with no mesal lobe or patch of black setae. *Genitalia* as in fig. 3. Ninth segment slender, narrowed ventrally, and reduced to a narrow bridge dorsally. Clasper projecting caudad just beyond any other portion of segment, dorsal margin straight, ventral margin evenly arcuate and forming a sub-acute apex. Cerci short and massive, directed dorso-caudad; distal margin from dorsal view, fig. 3B, widely rounded and dentate; ventral margin, lateral aspect fig. 3A, considerably shortened; from caudal aspect distal surface black, circular, concave and heavily sclerotized. Tenth tergite reduced, divided into two widely separated lateral lobes; when viewed dorsally, fig. 3B, platelike, lateral surface convex; from lateral aspect 3A, apex widely ovate, black, heavily sclerotized and setation sparse. Entire lateral arms of aedeagus sclerotized, sharply angulate distally, fig. 3C; mesal surface of apex bearing a row of fulvous, flattened dense setae reaching dorsad beyond apex of structure, fig. 3D.

*Holotype male*, PIPESTONE RIVER, NEAR LAKE LOUISE, ALBERTA, Aug. 22, 1954, D. G. Denning. *Paratype* male, 12 miles west of Banff, Alberta, July 23, 1949, C. P. Alexander.

**Limnephilus challisa** Denning, new species

This species is a member of the *cockerelli-harrimani* Banks section and is apparently closest to *lopho Ross*. It may easily be distinguished from that species and others, by the cerci being considerably shorter than the tenth tergite and the small appressed padlike ventral lobe of the tenth tergite.

*Male.*—Length 14 mm. Head, thorax and femora dark brown, remainder of legs, spurs, antennae and palpi fulvous, wings light brown, lightly irrorate with dark brown. Front basitarsus about one and one-half times length of second segment. Eighth tergite simple, mesal patch of black setae absent. *Genitalia* as in fig. 5. Ninth segment considerably narrowed dorsally and ventrally, sternum about one-third width of dorsum. Claspers consist of a short plate with distal margin incised to form a short triangular dorsal lobe and a large obtuse ventral lobe, bearing scattered short setae, fig. 5A. Cerci projected posteriad about two-thirds distance of tenth tergite; from

lateral aspect cercus is triangular; from dorsal aspect, fig. 5B, it is short, stocky, and digitate, thickened at base and gradually tapering to a rounded apex, mesal surface very heavily sclerotized and minutely dentate. Tenth tergite divided into two distinct lobes, long, narrowed and acuminate from dorsal aspect, fig. 5B; from lateral aspect dorsal margin oblique, ventral margin straight, apex subacute; ventral lobe padlike, closely appressed to sclerite and bearing dense black setae. Aedeagus with lateral arm completely sclerotized, fig. 5C, apex curved abruptly dorsad and bearing a brush of dense, long stout setae.

*Holotype male*, HYNDMAN CREEK, CHALLIS, BLAINE COUNTY, IDAHO, July 22, 1952, Borys Malkin. *Paratypes*, four males. Same data as for holotype.

**Lepidostoma baxea** Denning, new species

This is the second described species in the Cantha Group, and it can be differentiated from *cantha* Ross by the totally different baso-ventral sclerotized spur of the tenth tergite. In *cantha* these structures curve mesad and then laterad, in *baxea* they project directly caudad and only the extreme apical portion is curved laterad.

*Male.*—Length 8 mm. Thorax, head, legs and antennae ferruginous, wings gray with irregular scattering of black scales. Costal vein slightly reflexed most of length of costal cell, densely lined with black scales. First antennal segment without any modifications; maxillary palpi erect, the apparent single segment bearing a dense brush of long black scales. All spurs normal except inner spur of fore legs which is enlarged and covered with small black scales. In *cantha* and members of the Pluviale Group to which *baxea* and *cantha* are closely related, the legs and spurs are not modified. *Genitalia* as in fig. 6. Ninth segment annular, practically same width throughout, dorso-mesal margin projecting slightly caudad. Tenth tergite divided into two lateral lobes, consisting of an elongated tapering mesal lobe held roof-like and a caudad directed ventro-lateral spur, the distal portion slender, acute and curved laterad, best seen from dorsal aspect, fig. 6B. Claspers long, slender and tapering toward a truncate apex, heavily clothed with long hair; baso-dorsal lobe short, slender and digitate, fig. 6A. Aedeagus arcuate and bearing a pair of stout acuminate rods along contour of structure.

*Holotype male*, DRY CREEK, FRESNO COUNTY, CALIFORNIA, May 1, 1954, D. I. Abell, deposited in collections of California Academy of Sciences.

While most streams are of considerable interest because of the many ecological differences they exhibit from source to mouth, this stream as a productive source of such insects as Trichoptera, is unusual because of its intermittent flow, being dry in summer and fall. Dry Creek has been classified by Usinger (1956:15) in

Aquatic Insects of California, as a long-flow fluctuating intermittent stream. In the Central Valley Foothill region of California such long-flow intermittent streams are common; it is not known how productive of Trichoptera others of these kind of streams may be.

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# A NEW SPECIES OF STETHORUS WEISE FROM GUATEMALA NOW BEING RELEASED IN CALIFORNIA

(Coleoptera: Coccinellidae)

J. C. Hall and C. A. Fleschner
*University of California, Riverside*

In the winter of 1955, the junior author sent to the University of California at Riverside, Citrus Experiment Station, Department of Biological Control, a large number of live specimens of an undescribed species of *Stethorus* Weise found preying on avocado brown mites, *Oligonychus punicae* (Hirst), on avocado trees in Guatemala. This *Stethorus* was introduced into the United States in an attempt to establish it as a predator of Tetranychid mites.

Approximately 40,000 beetles have been released in citrus and avocado groves in seven California counties. In addition, 1,350 beetles have been sent to the Fruit Insects Laboratory of the United States Department of Agriculture at Orlando, Florida, for release there, and 300 beetles have been sent to the Texas Agricultural Experiment Station at Weslaco, Texas. At present it is not certain whether this *Stethorus* will become established in California.

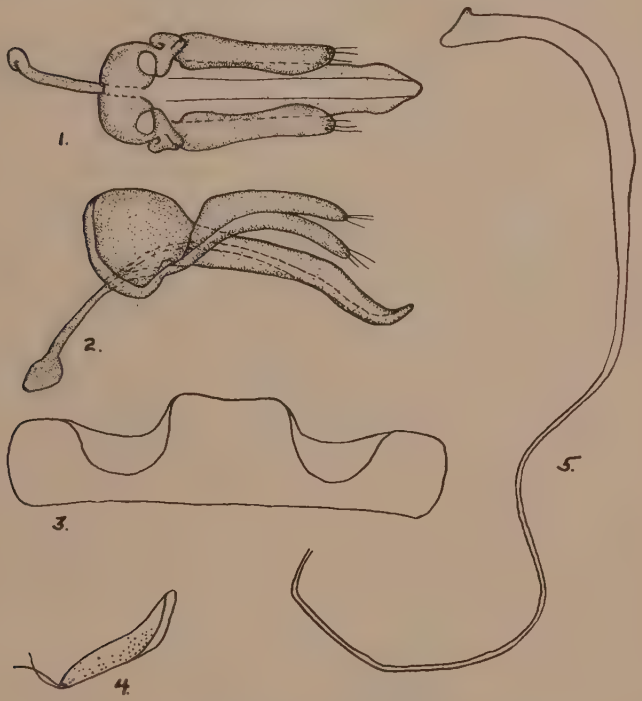
The following description is given at this time in order to make the name available for future publications and also to aid in its identification.

**Stethorus guatemalensis** Hall and Fleschner, new species

In coloration *S. guatemalensis* is similar to *S. punctum* (Le Conte); the genitalia is very much like *S. picipes* Casey. *S. guatemalensis* may be distinguished from *S. punctum* by the sub-

parallel sides of the pronotum and the broad femoral lines, from *S. picipes* by the yellow legs and mouthparts.

Body black; antennae, clypeus, mouthparts, apex of femora, all of tibiae and tarsi yellowish; pubescence yellow, long, erect, and recurved as usual. Prothorax nearly twice as wide as long, sides continuous, not strongly converging; punctures coarse, feeble, and close set, slightly stronger on lateral margins. Elytra twice as long as broad (narrower than in *S. picipes*), punctures coarse, moderately strong, close set in middle, finer and closer together on sides. Pubescence of venter short, yellow, appressed. Femoral lines broad, extending two-thirds or more posteriorly on abdominal segment one; last visible sternite of male with a shallow, rounded depression in middle of posterior margin. Male genitalia (Fig. 1): Very much like *S.*




EXPLANATION OF FIGURES

Fig. 1, Dorsal view of aedeagus and associated parts. Fig. 2, Lateral view of the same. Fig. 3, First abdominal sternite. Fig. 4, Ninth abdominal sternite of the female. Fig. 5, Sipho.

*picipes:* sipho long, thick basally, thin apically; capsule bulbous, only slightly furcate; basal plates large, rounded; parameres short, thick, approximately two-thirds as long as the aedeagus, several short hairs at tip; trab short, thin, apex swollen; aedeagus thick, apex in dorsal view, acutely rounded, lateral view, tip bent upwards at about a 45° angle. Ninth sternite of female, with each half acutely rounded at base, comparatively slender, apex pointed, with 2–3 long setae, longer than width of segment.

Only a very small amount of variation in the above mentioned characters has been noticed. The pubescence varies from yellow to white; the pale color of the mouth parts and legs may be yellow or orange; the femora are occasionally grayish in the middle only; femoral lines vary from half to two-thirds the length of the first abdominal segment.

*Holotype* and *allotype:* ANTIGUA, GUATEMALA, March 5, 1955 (C. A. Fleschner), from avocado; deposited in the collection of the California Academy of Sciences, San Francisco. Paratypes from material reared in the insectary of the University of California at Riverside are deposited in the U.S. National Museum, University of California at Berkeley and at Davis, and in the authors' collections.

*S. guatemalensis* has been released in the following counties in southern California: Ventura, Orange, San Diego, San Bernardino, Santa Barbara, Los Angeles, and Riverside. Releases have also been made in Texas and Florida.

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## BOOK REVIEW

A TEXTBOOK OF ENTOMOLOGY. Second Edition. By Herbert H. Ross. John Wiley & Sons, Inc., New York. xi+519. 1956. Price $7.75.

This second edition of Ross' popular and well balanced Textbook of Entomology represents a considerable revision. Some of these changes are: the addition of recent data in many sections of the text, a new and pleasing style of type, a doubling of the number of references, the addition of treatments on the phylogeny of the Arthropoda and of the Insecta, an added treatment on population dynamics, modified or new keys for the identification of insect orders and families accompanied by more illustrations of diagnostic characters, a number of improvements in the illustrative material, and many other changes such as the correction of minor errors which are made possible by this second edition. Together these changes provide an authorative and up-to-date textbook for the beginning entomologist and for the general zoologist who wish an introduction to this interesting group of animals. The changes in illustrations and particularly the full labeling of many anatomical structures will be a major aid to these students.—J. W. MACSWAIN, *University of California, Berkeley.*

# SYNONYMY IN THE ORIENTAL SPECIES OF THE SUBGENUS MICROSCOLIA BETREM

(Hymenoptera: Scoliidae)

J. CHESTER BRADLEY
*Ithaca, N. Y.*

## SCOLIA (MICROSCOLIA) MACROCEPHALA (Gribodo) and S. (M.) BELLA Rohwer

Through courtesy of the authorities of the City Natural History Museum of Genoa I have had opportunity to study the holotype of *Triscolia macrocephala* Gribodo. It is not the taxonomic species that Betrem in his Monographie der indo-australischen Scoliiden, Treubia, 1892, v. 9, supplement, p. 205, had supposed it to be, but is a taxonomic species omitted in that monograph. The following addition to Betrem's key to females, *loc. cit.* p. 198, will provide for it.

4c. Vertex very sparsely punctate, almost smooth; tergum 3(2) almost smooth, much more finely punctate than in kollari; mesoscutum with two smooth strips near the middle (but on one side in the type the strip is somewhat encroached upon by punctures; wings reddish purple, as in *kollari;* Jolo Island.....*macrocephala* Gribodo

The taxonomic species from the Philippines that Betrem misidentified as *macrocephala* will take the name of its oldest synonym, namely *bella* Rohwer, therefore, for the heading "*Scolia macrocephala* Gribodo" on p. 205 read "*Scolia bella* Rohwer," and in the key to females, p. 199, for "*S. macrocephala* Rohwer" (a *lapsus* for Gribodo), couplet 5b and couplet 2a in the key to males, read "*S. bella* Rohwer."

## SCOLIA (MICROSCOLIA) PARASTASIAE Betrem and S. (M.) KUEHNI (Micha) Betrem

Dr. Betrem (Stett. Ent. Zeit., 1933, 94:252) has pointed out that *parastasiae* Betrem (1928:206) is the female of *kuehni* Micha (Mitt. Zool. Mus. Berlin, 1927, 13:91) and has given additional characters for the male and figured its genitalia. The center heading "*Scolia parastasiae* nov. spec." (Betrem, 1928:206) must therefore read "*S. kuehni* (Micha)" Betrem. In Betrem's key to females, p. 198, couplet 3a, change "*parastasiae* Betr." to "*kuehni* (Micha)," and in the key to males, p. 199, couplet 2a should lead to "*megacephala* Rohwer from the Philippines and *kuehni* (Micha) from Buru." An examination of Micha's holotype of *kuehni* in the Berlin Museum, (studied through courtesy of Dr. H. Bischoff)

in 1929 had convinced me that it could not be distinguished externally from *megacephala* Rohwer.

SCOLIA (MICROSCOLIA) PSEUDOFORAMINATA (Gribodo) Betrem

I have also had an opportunity to study Gribodo's holotype of this species in Genoa. It is neither a synonym of *macrocephala* (Gribodo) nor of *bella* Rohwer, as given by Betrem (1928:205). On the contrary *bellina Rohwer* is its junior synonym and the center heading "*Scolia bellina* Rohwer" on p. 205 must be replaced by "*Scolia pseudoforaminata* (Gribodo) Betrem." In his key to males, p. 200, couplet 7b, "*bellina*" must likewise be changed to "*pseudoforaminata*."

In the type of *pseudoforaminata* the wings are bronzy, not deeply colored, apically with a weak rosy reflection; antennae ferruginous; legs and abdomen with a perceptibly ferruginous shade, the abdomen strongly overlaid with irridescent blue; the setae on the apical part of the abdomen, appearing black, are seen on close examination to have a decided reddish brown shade. There are many white hairs on the underside of the head and thorax.

SCOLIA (MICROSCOLIA) MAGRETTII (Gribodo) Betrem

I hereby designate the female syntype of *magretti* in the collection of the Genoa museum to be the lectotype. It belongs to the taxonomic species *kollari* Saussure, (Betrem, 1928:204) under which Betrem has already listed the male as a synonym (at the same time also listing the male as a separate species, see below) Betrem specifically excluded the female from the synonymy of *kollari*, p. 204, and of his interpretation of *magrettii*. As this leaves no place in his scheme for the female, it seems likely that he intended, in the synonymy of *kollari*, that one should read "*magrettii* ♀, *nec* ♂" instead of vice versa.

Both the female lectotype of *magrettii* and the male allotype (also in the Genoa Museum) belong to *kollari*. The sternal fringes 2 and 3 of the male are white, the head, pleura, sternum venter except apically and legs are largely white-haired. Gribodo erred in saying black. The wing color in each sex is alike, a little deeper more brown bronze and less green bronze than in a specimen before me determined by Betrem as *magrettii*. In fact the male allotype agrees exactly with a male which Betrem has determined as *kollari*.

Since the name "*magrettii* Grib." cannot be applied to the taxonomic species to which Betrum has applied it on p. 206, this species must be named anew:

**Scolia (Microscolia) obiensis** Bradley, new species

Male described by Betrem (1928:206) under the misapplied name "*Scolia magrettii* Grib." and differentiated under that name in his key to males, p. 200, couplet 8a.

*Holotype*, from Obi Islands, the "plesiotype of *magrettii*" referred to by Betrem, p. 206, in the Leiden Natural History Museum.

I have studied the holotype of *Scolia tyrianthina* Kirby, of *Scolia hydrocephala* (Micha) and the lectotype of *Scolia cephalotes* Burmeister and find them correctly placed in Betrem's key to the females, p. 198.

The holotype of *papuana* (Micha) is correctly placed by Betrem (1928:207), as a synonym of *pygmaea* Saussure.

In addition to the Oriental species of *Microscolia*, there are some from Africa which will be treated in a manuscript now ready for print.

Oriental Species of Microscolia

**cephalotes** Burmeister, ♀, ♂. Java.
*foraminata* Saussure.
**tyrianthina** Kirby, ♀, ♂. Andaman Islands.
**hydrocephala** (Micha) Betrem, ♀, ♂. Ceylon and southern India.
**karnyi** Betrem, ♂. Mentawei Islands.
**kollari** Saussure, ♀, ♂. Borneo, Sumatra, Malacca, Tenasserim.
*magrettii* (Grib.) Betrem; *aglana* Cameron; *crassiceps* Cameron; *pachycephala* (Micha); *sumatrana* (Micha); *chalcoptera* (Micha); *aeneipennis* (Micha); *violaceipennis* (Micha).
**khasiana** Betrem ♂. Assam.
**macrocephala** (Gribodo) Betrem. Jolo Island.
**bella Rohwer,** ♀, ♂. Philippine Islands.
**pseudoforaminata** (Gribodo) Betrem. Philippine Islands.
*bellina* Rohwer.
**megacephala** Rohwer, ♀, ♂. Philippine Islands.
**obiensis** Bradley. Obi Island.
**kuehni** (Micha) Betrem. Buru Island.
*parastasiae* Betrem.
**pygmaea** Saussure, ♂. Australia, New Britain, New Mecklenburg.
*papuana* (Micha).
**maindroni** Betrem, ♂. New Guinea (For supplementary description of Betrem 1933, p. 252).
**apicata** Smith, ♀, ♂. Celebes.

# THE OCCURRENCE OF ANOPLODERA CRASSIPES (LECONTE) IN OLD LUMBER

(Coleoptera: Cerambycidae)

*Anoplodera crassipes* (LeConte) occurs throughout the Pacific Slope of the United States from sea level to high elevations and the adults are collected on the flowers of many plants. The species has been recorded from a number of tree species including *Abies grandis, Pseudotsuga taxifolia, Pinus* spp., *Sequoia sempervirens, Umbellularia californica* and *Eucalyptus* sp. Apparently the larvae may feed in freshly killed trees as indicated by the following unpublished record from the collections of the U. S. Forest Service at Berkeley. A lodgepole slab, infested with *Dendroctonus monticolae* Hopkins, was taken at Eleven Mile Meadow, Yosemite National Park, California, on August 7, 1935, by G. R. Struble. Later, an adult of *A. crassipes*[1] (Hopkins No. U. S. 21018a) emerged.

Several additional collections of *A. crassipes*[1] were made in an older residential section of Oakland, California. These are of interest in that the beetle was surviving in old Douglas fir[2] lumber in an area where none of its tree hosts existed. Originally this lumber had been part of a shed and chicken house that had been built in 1897. In 1941 these structures were demolished and some of the rough timbers were used to build fences and garden paths. The beetles were breeding in the more decayed portions of the boards on the ground and in the lowest portions of the fences where they were in contact with the ground. The beetles were discovered, as larvae, in a piece of 2″ × 8″ laying on the ground on February 17, 1957. On May 30, 25 pupae and one larva were removed from one end of a partially decomposed 1″ × 12″ board. A few days later, a number of adults and a few pupae were collected from other boards and a few adults were found on a small composite. The beetles appeared to be confined largely to partially decomposed wood and had apparently been breeding in this lumber for many generations.—J. W. MacSwain, *University of California, Berkeley.*

[1] Identified by E. G. Linsley, University of California, Berkeley.
[2] Identified by R. A. Cockrell, University of California, Berkeley.